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TECHNICAL report

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Flow Rate Testing of Valves Used with the 500 Gallon Collapsible Drum

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by
William D. Perdue

Report Date
April 1992

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This report covers the test and evaluation of four couplings/valves used with the 500-gallon collapsible drum: the existing poppet valve, a new redesigned poppet valve, a Carter refuel/defuel valve that works in conjunction with the single point refueling nozzle, and a Kamvalok dry-break coupling valve. The purpose of this testing was to determine maximum flow capability of each valve design and identify any new characteristics that may impact performance of the FARE system.

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Report Number 2525

Flow Rate Testing of Valves Used with the 500 Gallon Collapsible Drum

by
William D. Perdue

**US Army Belvoir RD&E Center
Fort Belvoir, Virginia 22060-5606**

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Tables:

Section I
Introduction

T he Forward Area Refueling Equipment (FARE) is currently the Army's only air-emplaced refueling system for use in Forward Arming and Refueling Point (FARP) operations. The 500-gallon collapsible drum, as described in MIL-D-23119, is the primary source of fuel for the FARE system. The rate at which fuel is extracted from the drum directly impacts the length of the refueling operation and the overall mission success. This report covers the test and evaluation of four couplings/valves used with the 500-gallon collapsible drum: the existing poppet valve, a new redesigned poppet valve, a Carter refuel/defuel valve that works in conjunction with the single point refueling nozzle, and a Kamvalok dry-break coupling valve manufactured by OPW. Figures 1, 2, 3, and 4 provide sketches of each valve configuration. Functionally, each valve satisfies the requirements necessary to allow successful drum operation. All provide dry-break capability, meet or exceed operating pressure requirements, and dimensionally fit into the existing opening on the drum. The Carter refuel/defuel valve is the only one that limits internal tank pressure during drum filling.

The purpose of this testing was to determine maximum flow capability of each valve design and identify any new characteristics that may impact performance of the FARE system.

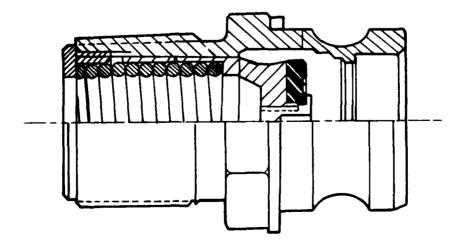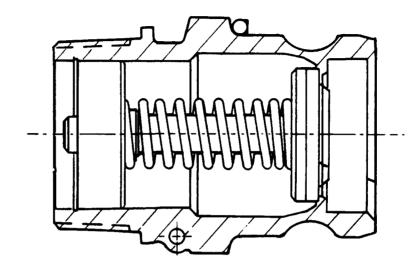**Figure 1. Existing Poppet Valve—Part Number 77-A**
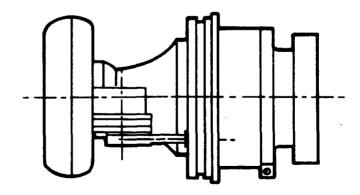
Figure 2. New Poppet Valve—Part Number 77-A

Figure 3. Carter Refuel/Defuel Valve—Part Number 61499

Figure 4. 3-inch Kamvalok—
Part Number 1611-A-3 (adaptor) and 1711-D-3 (optional)

Section II
Test Facilities

T he testing was done at the US Army Belvoir Research, Development and Engineering Center, Petroleum Test Area, Fort Belvoir, VA. Test data measurement devices included:

- Hoffer Controls turbine flow meter
- Omega strain gage type pressure transducers (0-6 and 0-200 psig)
- Type T thermocouple

The output from each device was automatically read and recorded, once every second, using a Hewlett Packard System 10 data acquisition system and Compaq portable computer. Valves were recorded for fuel flow rate, internal tank pressure, supply line pressure, and ambient temperature. The test fluid was JP-5 fuel conforming to MIL-T-5624.

Fluid flow for the test was provided by an end suction centrifugal pump driven by a diesel engine. The pump was rated at 200 gallons per minute (gpm)—180 feet total head. The capability of the pumping unit is illustrated in the performance curve shown in Figure 5.

Figure 5. Pump Performance Curve

Three 500-gallon drums, one arctic and two temperate climate, were used in the test. Each drum was fitted with a different valve on each end: one temperate drum with the existing poppet valve and a Carter refuel/defuel valve; the other with a new design poppet valve and a Carter refuel/defuel valve; and the arctic drum with an existing poppet valve and 3-inch Kamvalok dry-break.

A complete listing of the test equipment used to perform the drum valve testing with performance ranges and identifying numbers is given below:

Data Acquisition System
  Hewlett Packard, HP75000 Series B, Model E1300A

Computer
  Compaq SLT/286, Model 40, 80C286 microprocessor

Power Supply
  Hewlett Packard, Model 6236B

Pressure Transducers
  Omega, Model PX105, 0-6 psig
  Omega, Model PX105, 0-200 psig

Pumping Assembly
  Pump: Peabody Barnes, Model US33HACD, 200 gpm at 175 feet total head
  Engine: Ruggerini Model MD151, 13 hp at 3600 rpm

Flow Meters
  Hoffer Flow Controls, Model HO1-1/2x1-1/2-8-130-B-IMC3PAX-FICS

Section III
Test Procedures

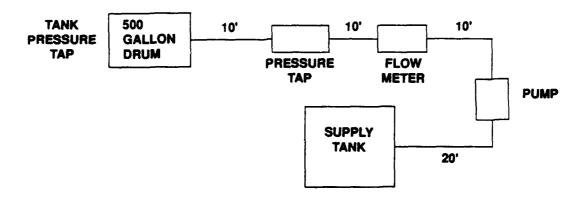Using the pumping unit described, the test procedure consisted of filling and emptying the drum to determine maximum flow capability of each valve under conditions present at the time of the test. The test setup is shown in Figure 6.

DRUM FILL TEST SET-UP

```
TANK        ┌─────────┐        ┌──────┐        ┌──────┐
PRESSURE    │  500    │   10'  │      │   10'  │      │   10'
TAP         │ GALLON  │────────│      │────────│      │────────┐
            │ DRUM    │        └──────┘        └──────┘        │
            └─────────┘      PRESSURE          FLOW          ┌───┐
                               TAP            METER          │   │  PUMP
                                                             │   │
                          ┌──────────┐                       └───┘
                          │ SUPPLY   │                         │
                          │ TANK     │─────────────────────────┘
                          │          │        20'
                          └──────────┘
```

DEFUEL TEST SET-UP

```
┌─────────┐        ┌──────┐        ┌──────┐
│ SUPPLY  │   50'  │      │   10'  │      │   10'
│ TANK    │────────│      │────────│      │────────┐
│         │        └──────┘        └──────┘        │
└─────────┘         FLOW          PRESSURE       ┌───┐
                    METER           TAP          │   │  PUMP
                                                 │   │
                                                 └───┘
                                                   │
                                                   │ 10'
                                                 ┌───────┐
                                                 │ 500   │
                                                 │ GALLON│
                                                 │ DRUM  │
                                                 └───────┘
                                                   TANK
                                                 PRESSURE
                                                   TAP
```
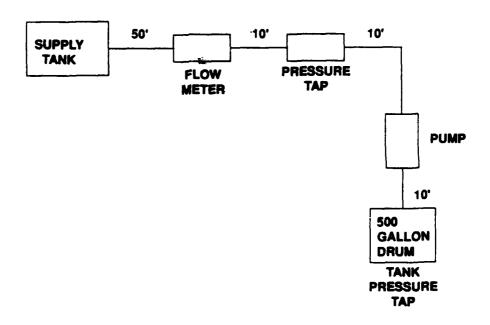
Figure 6. Hardware Setup for Poppet Valve Testing

To minimize suction losses, only two 5-foot lengths of suction hose were used between the drum and the pump during defueling. Ten feet was considered the minimum suction hose length that would allow the drum to properly collapse. The test setup was identical for each valve, except 3-inch suction hose was used for the Kamvalok in lieu of the 2-inch hose used for the other valves.

The two poppet valves and the Kamvalok dry-break coupling do not limit internal tank pressure during fueling of the drum. Therefore, manual pressure control to prevent drum failure was required with these valves. This was accomplished by constant monitoring of internal tank pressure and terminating flow before tank pressure exceeded 5 psig. Supply line pressure and flow rate were controlled by varying engine speed.

The test procedure consisted of:

1. Configuring test hardware for a fill or defuel cycle in accordance with Figure 6.

2. Starting pump and data acquisition system.

3. Opening drum valve.

4. Increasing engine rpm until the desired fill or maximum defuel rates were achieved.

5. Shutting off pump when the drum was full or pump cavitation occurred when defueling.

In the case of the Carter refuel/defuel valve, internal pressure was allowed to exceed 5 psig to verify operation of the automatic shutoff feature of the valve. Defueling through each valve continue until the pump lost suction.

Section IV
Published Pressure Drop Data

Pressure drop data published by the manufacturer for each of the four test valves is given in Figure 7. The test liquid was water, except for the Carter refuel/defuel valve which used fluid conforming to PD-680, Type II. As expected, the 3-inch Kamvalok exhibited the best pressure drop characteristics. This data also shows the improved flow characteristics resulting from the redesign of the OPW 77-A poppet valve.
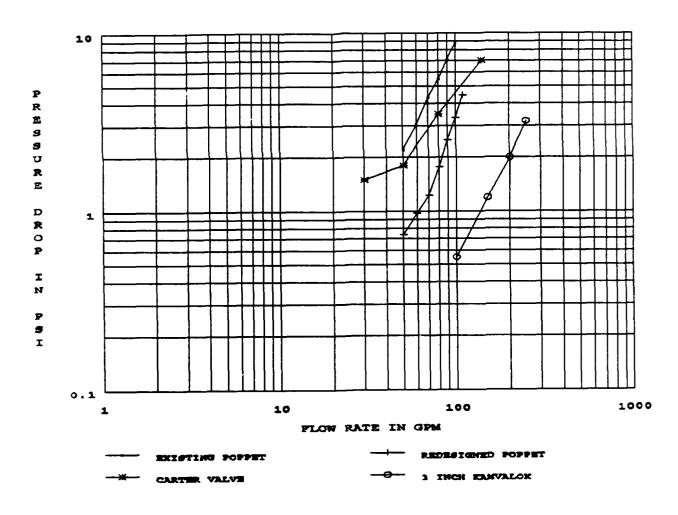

Figure 7. Published Pressure Drop Data for Each Valve Tested

Section V
Test Results

EXISTING POPPET VALVE

Filling the drum presented no problems. Flow rate was maintained around 100 gpm and internal tank pressure reached a maximum of 5.1 psig.

For a typical defuel cycle, Table A-1, Appendix, shows the recorded values for line pressure, flow rate, and tank pressure. A maximum defuel rate of 84 gpm was achieved with a 79 gpm average. This was within the expected values for this particular poppet design. Tests conducted during the development of the FARE system, using a FARE pump, yielded a maximum flow of 74 gpm from one drum. [See Report 2029, "Forward Area Refueling Equipment (FARE)", by W. Studebaker and J. Christopher, April 1972.] The rate experienced under actual field conditions will vary with terrain, number of hoses and valves, and the capabilities of the pump. Figure 8 shows a flow rate plot for a typical defuel cycle. The decrease in flow rate as the drum emptied can be attributed to the changing system suction conditions.
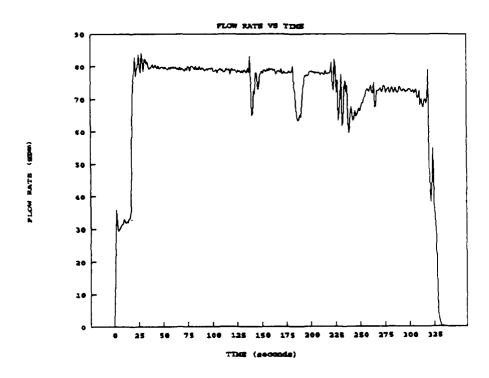

Figure 8. Defuel Rate for Existing Poppet Valve

NEW POPPET DESIGN

As with the existing valve, the new poppet does not control delivery pressure. During drum fill, internal tank pressure was monitored and flow terminated before drum pressure reached 5 psig. A flow rate of around 100 gpm was maintained for the duration of the fill cycle with a high internal tank pressure of 3.9 psig.

Defueling rates averaged 98 to 99 gpm, with a high recorded value of 102 gpm. These values were about 20 gpm higher than the flow rate achieved with the existing valve design. Table A-2, Appendix, contains the values recorded for a typical defuel cycle. As seen in Figure 9, flow rate decreased as the fluid level in the tank went down. As with the old poppet design, this reduction can be attributed to changing suction conditions.
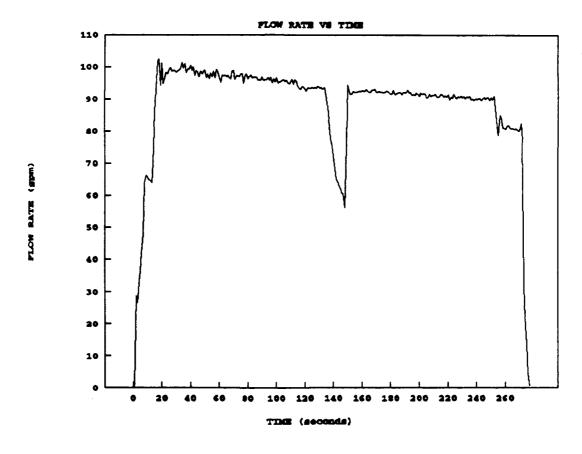

Figure 9. Defuel Rate for New Poppet Valve

REFUEL/DEFUEL VALVE

The Carter refuel/defuel valve is designed to limit internal tank pressure to less than 5 psig during drum fill. When tank pressure approaches 5 psig, the valve terminates flow. Four refuel/defuel cycles were conducted using Carter valve number 1. The following table provides the average flow rate and maximum internal tank pressure recorded during each of the four fill cycles.

Table of Flow Rates and Pressures Recorded During Drum Fill Using the Carter Refuel/Defuel Valve

CYCLE NUMBER	AVERAGE FLOW RATE (gpm)	TANK PRESSURE (psi)
1	177	4.6
2	180	4.1
3	180	7.7
4	175	7.1

The data shows that the valve performed according to specification during the first two cycles, but failed to limit internal tank pressure during the last two. Tables A-3 and A-4, Appendix, provide a complete set of values recorded during the first two cycles. Figures 10 and 11 provide plots of internal tank pressure and fill flow rates for Cycle 1. A relatively constant fill rate created a steady rise in internal pressure tank pressure up to the point of flow termination.
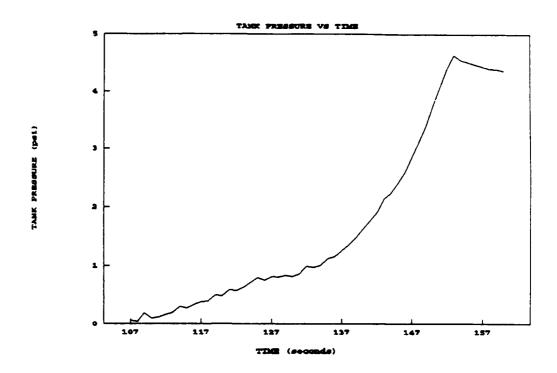
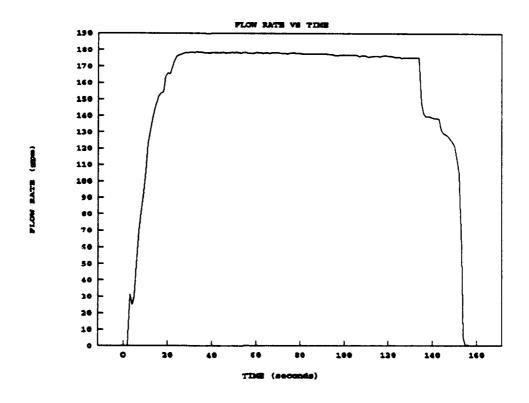**Figure 10. Internal Tank Pressure During Fill Cycle 1**

Figure 11. Fill Rate During Cycle 1

During fill Cycles 3 and 4, internal tank pressure exceeded 5 psig, requiring manual flow termination to prevent drum damage. Tables A-5 and A-6, Appendix, provide a complete set of values recorded during these cycles. Plots of tank pressure vs. time for Cycles 3 and 4, Figures 12 and 13, do not indicate any abnormal behavior. As with the previous runs, a steady increase in pressure is experienced as the drum fills. Cause of the malfunction is unknown.
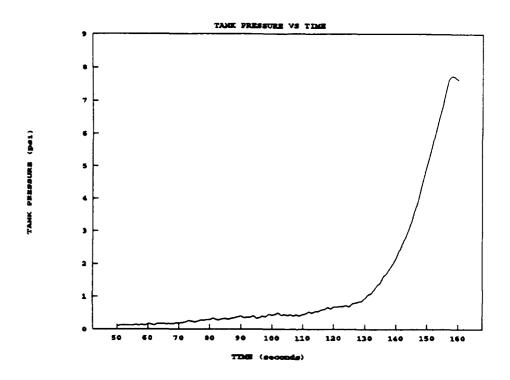
TANK PRESSURE VS TIME

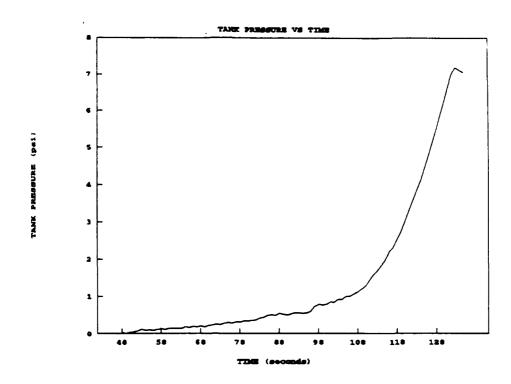**Figure 12. Internal Tank Pressure During Fill Cycle 3**

Figure 13. Internal Tank Pressure During Fill Cycle 4

Testing continued using Carter valve number 2. The valve was installed into the test fixture and the drum filled. This valve also failed to terminate flow before the internal tank pressure reached 5 psig. Internal tank pressure was allowed to exceed 6.5 psig before manual flow termination. As with the first valve, no immediate cause of the failure was found.

Data provided by the manufacturer indicates that each valve had been subjected to a 1,000 cycle shut-off test without any recorded malfunctions. We returned the valves to the manufacturer for inspection and identification of the problem.

Defueling ran at an average rate of 99 gpm. The Carter defuel rate was very similar to that of the new poppet design. Table A-7, Appendix, provides recorded values for flow and pressure for one of the defueling runs. Figure 14 provides a plot of flow rate vs. time for a typical defuel cycle.
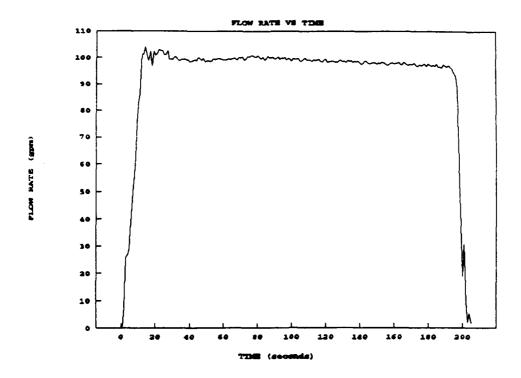
Figure 14. Defuel Rates for Carter Refuel/Defuel Valves

The operation of the refuel/defuel valve requires a single point nozzle (see Figures 15 and 16). A D-2 type nozzle was used for this test. The nozzle and supply hose rotated from horizontal to near vertical as the drum emptied (see Figure 17). This caused problems emptying the drum completely since the moment applied by the nozzle and hose prevented the drum from collapsing. This resulted in flow interruption and loss of pump suction. Approximately 90 to 100 gallons of fuel remained in the drum when suction was lost. To overcome this problem, the hose had to be raised and supported manually to allow all of the fuel to be removed. This problem would be reduced by using a D-1 type nozzle which has a 45 degree inlet. As shown in Figure 18, both the existing and new design poppet valves incorporate a 90 degree elbow for fueling and defueling which allows the hose to remain horizontal during filling or defueling.
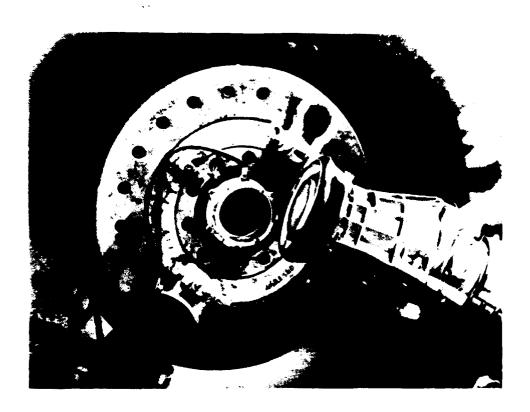
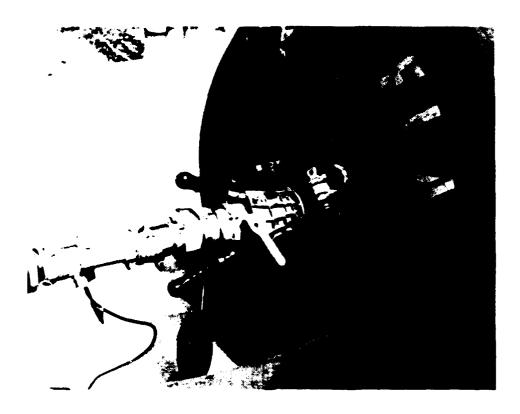Figure 15. Refuel/Defuel Valve Connection and Single Point Nozzle

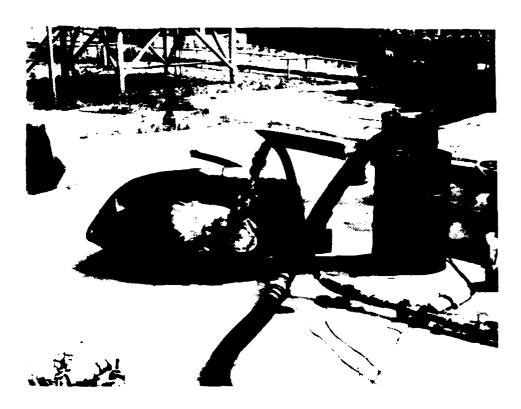Figure 16. Single Point Nozzle Connected to Refuel/Defuel Valve; Drum Being Filled

Figure 17. D-2 Nozzle Connected to Drum
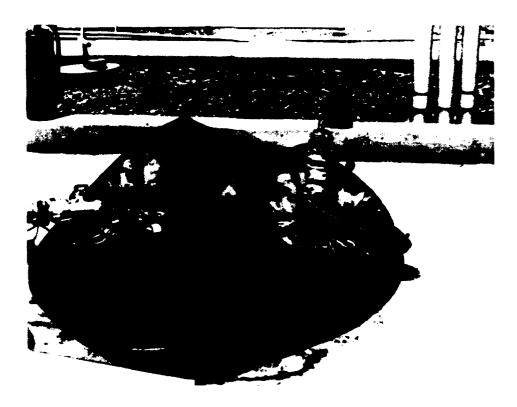*(Note: Nozzle is near vertical)*

**Figure 18. Poppet Valve with 90° Connection on Left and
D-2 Connected to Refuel/Defuel Valve on Right**

KAMVALOK DRY-BREAK

The drum was filled at a varying flow rate from a high of 173 to a low of 114 gpm. To reduce the risk of over pressurization, engine rpm was decreased as the drum filled. A maximum internal tank pressure of 4.85 psig was recorded during the fill cycle.

Defueling of the drum through the 3-inch valve peaked at about 190 gpm. As expected, this was significantly higher than the other three test valves. The higher flow rate can be attributed to the larger size valve and hose (3 inch vs. 2 inch). Table A-8, Appendix, provides values recorded during a typical defueling cycle. Figure 19 shows the defuel rate over time. The initial erratic flow rate was caused by changes in pump engine rpm and not by the valve.

The straight inlet connection of this valve resulted in similar problems as experienced with the Carter valve. As the drum collapsed, the hose moved toward a vertical position. The weight of the hose did not allow the drum to collapse freely. This removed the outlet from the surface of the fuel and resulted in a loss of pump suction. Figure 20 shows the position of the hose and drum outlet when manual assistance was not provided and loss of suction resulted. Figure 21 shows the position of the hose and drum outlet when hose is manually supported and the drum collapses as designed. The amount of remaining fuel at pump cavitation was estimated to be 90 to 100 gallons.

The drum is a non-vented tank and ideally does not contain air, only fuel. An air-free drum would eliminate the problems experienced with the Carter and Kamvalok valves. Though care was taken to limit the amount of air, it was impossible to keep the drums completely air free. The most practical problem solution would be to add a 90 degree elbow to the drum's inlet.
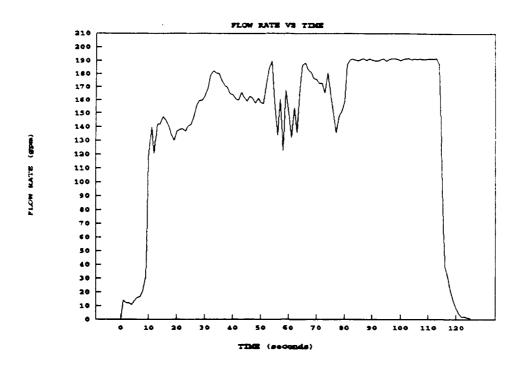
Figure 19. Defueling Rates for 3-inch Kamvalok

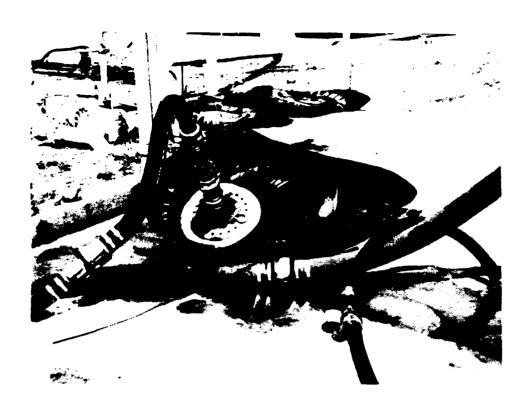**Figure 20. Kamvalok Position Without Manual Assistance**

Figure 21. Kamvalok Position With Manual Assistance

Section VI
Summary

- The new design poppet valve reduces resistance and increases flow rate over the existing poppet design when defueling a 500-gallon drum. An increase of about 20 gpm can be expected when drawing fuel from a single drum.

- The Carter refuel/defuel valve exhibits about the same defuel characteristics as the new poppet design. Figure 22 provides a comparison of the defuel rates of the four valves.
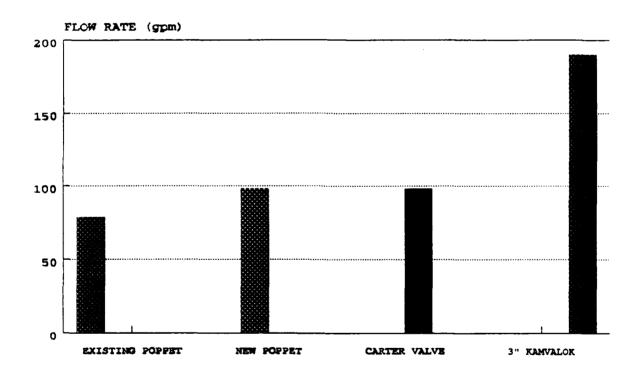
FLOW RATE (gpm)

```
200 ┤                                                              ▓
    │                                                              ▓
    │                                                              ▓
150 ┤                                                              ▓
    │                                                              ▓
    │                                                              ▓
100 ┤              ░              ▓              █              ▓
    │      ░       ░              ▓              █              ▓
 50 ┤      ░       ░              ▓              █              ▓
    │      ░       ░              ▓              █              ▓
  0 ┴──────────────────────────────────────────────────────────────
      EXISTING POPPET    NEW POPPET      CARTER VALVE      3" KAMVALOK
```

Figure 22. Defuel Rate Comparison

- Automatic pressure shut-off capability provides the refuel/defuel valve an advantage over the poppet valves when filling the drums.

- Using the single point nozzle with the refuel/defuel valve provides two major advantages over the other test valves: the ability to recirculate fuel through the nozzle, and the ability to fill the drums using the single point nozzle.

- The Carter refuel/defuel valve is more expensive than the poppet valves or the Kamvalok. In addition to the higher valve cost, a single point nozzle is required for valve operation.

- All of the valves provide dry-break capability

- As expected, the maximum flow capability of the 3-inch Kamvalok is significantly higher than the other valves tested.

- The straight inlet connection used by the Carter refuel/defuel valve and the OPW Kamvalok impede the ability of the drum to collapse as designed. Configuration modifications to incorporate an elbow will reduce or eliminate this problem.

- The maximum flow rate of the Carter refuel/defuel valve may be improved by using a larger hose (2 1/2 or 3 inch).

Section VII
Conclusions and Recommendations

T he results of this test confirm that the redesigned poppet valve will improve performance of the FARE system during refueling operations. Recommendations are to:

- Evaluate the malfunctions of the Carter refuel/defuel valve before further testing.

- Obtain user comments regarding the added capability provided by this type of valve, such as recirculation through a single point nozzle, pressure regulation during fill, and ability to fill drums using a single point nozzle. This investigation should include cost, reliability, maintenance requirements, and weight and space requirements. Similar configurations of this type of valve are currently in use by the Marine Corps.

Appendix of Tables

Table A-1. Defuel Drum—Existing Poppet Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	1.0359	2.5	6.7539	83.9662
2	0.9609	4.2188	35.9531	83.924
3	0.9422	5.7812	31.7891	83.9152
4	0.9234	5.3125	29.4531	83.8695
5	0.8625	5.4688	29.8594	83.8432
6	0.8766	4.0625	30.3164	83.8977
7	0.8484	3.9062	30.9258	83.8027
8	0.8063	2.8125	31.4336	83.7975
9	0.8109	3.2812	31.5352	83.808
10	0.7641	4.5312	33.1094	83.8098
11	0.7313	2.8125	32.2461	83.7957
12	0.7172	1.0938	31.8398	83.8432
13	0.7031	4.375	32.0938	83.8889
14	0.6797	3.75	31.9414	83.8959
15	0.6703	3.75	33.0078	83.8344
16	0.6047	1.875	33.2109	83.8291
17	0.6188	4.6875	35.75	83.7465
18	0.5484	10.7812	54.793	83.8133
19	0.5203	7.6562	75.4101	83.8361
20	0.4734	11.7188	78.4063	83.8256
21	0.4313	8.4375	82.7734	83.8484
22	0.3938	9.2188	76.9336	83.8748
23	0.3563	7.8125	79.4219	83.8748
24	0.3422	9.2188	79.7774	83.9064
25	0.2859	6.7188	83.7383	83.9275
26	0.3047	6.875	79.7774	83.9855
27	0.3047	7.3438	78	83.8766
28	0.3094	8.5938	84.1953	83.9328
29	0.2813	7.9688	81.707	83.9187
30	0.2766	10	78.4063	83.982
31	0.2859	7.0312	82.1133	83.8854
32	0.2625	7.5	82.3164	83.8854
33	0.2438	7.8125	80.7422	83.9064
34	0.2297	7.6562	81.3516	83.9539
35	0.2297	7.3438	80.082	83.9187
36	0.2156	7.6562	79.2188	83.8291
37	0.2344	9.0625	79.6758	83.8977
38	0.2063	9.2188	79.6758	83.9486
39	0.2203	8.125	80.5899	83.9926
40	0.1922	7.1875	79.6758	83.9187
41	0.1875	6.7188	79.7266	83.9521
42	0.1688	6.7188	80.4883	83.9012
43	0.1781	7.0312	79.8789	83.9117
44	0.1781	7.5	79.2695	83.9117
45	0.1828	7.5	80.2344	83.9539
46	0.1781	8.9062	79.3711	83.9697
47	0.1781	7.6562	79.4726	83.9768
48	0.1453	7.0312	79.8281	84.0137

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	0.1688	7.8125	79.7266	83.9996
50	0.1594	9.0625	79.8281	84.0172
51	0.1594	8.4375	79.3203	84.0383
52	0.1453	9.375	79.7266	84.0805
53	0.15	8.9062	79.4726	84.0295
54	0.1125	8.5938	79.0156	83.9363
55	0.1406	6.875	79.0664	83.9557
56	0.1313	7.1875	79.8281	84.0189
57	0.1266	8.75	79.2188	84.084
58	0.1266	6.7188	79.8281	84.0102
59	0.1219	7.3438	79.4219	84.0945
60	0.1078	7.6562	79.8789	84.1262
61	0.0938	7.0312	79.4219	84.1736
62	0.1078	8.125	79.8281	84.1543
63	0.1031	7.0312	79.625	84.1842
64	0.0891	7.8125	79.0664	84.2439
65	0.0891	7.9688	79.4219	84.1754
66	0.0844	8.4375	78.8633	84.1754
67	0.0656	7.8125	79.7774	84.0084
68	0.0703	7.3438	78.8125	83.9328
69	0.0469	8.4375	79.3711	83.9135
70	0.0609	8.9062	79.2188	83.8924
71	0.0375	7.6562	78.9141	83.8924
72	0.0609	8.125	78.5586	83.9135
73	0.0328	8.2812	79.5234	83.7482
74	0.0328	8.5938	78.8125	83.7166
75	0.0281	7.5	79.9805	83.6586
76	-0.0047	8.2812	79.8281	83.7236
77	-0.0094	7.8125	78.5586	83.801
78	0.0234	7.0312	80.082	83.7447
79	-0.0094	6.7188	79.9805	83.7465
80	-0.0047	8.75	79.9297	83.7254
81	0	7.8125	79.5742	83.7324
82	-0.0188	9.6875	78.9649	83.7148
83	-0.0141	7.9688	79.9805	83.7535
84	-0.0234	7.6562	79.0156	83.6955
85	-0.0234	7.6562	79.4726	83.692
86	-0.0188	8.4375	79.1172	83.7605
87	-0.0094	6.7188	80.0313	83.6709
88	-0.0375	7.5	79.168	83.7605
89	0.0328	8.75	79.168	83.7289
90	0.15	7.9688	79.6758	83.7781
91	0.1219	7.0312	79.3711	83.8502
92	0.1359	8.9062	78.6094	83.808
93	0.1313	8.2812	78.8125	83.7781
94	0.1219	7.8125	79.3203	83.7746
95	0.1125	7.8125	78.9141	83.7887
96	0.1078	7.9688	79.2695	83.7588

Table A-1. Defuel Drum—Existing Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.1078	7.9688	79.4726	83.8537
98	0.0891	7.6562	79.2188	83.7852
99	0.0703	6.0938	79.4219	83.7078
100	0.0703	7.0312	79.5234	83.6111
101	0.0891	8.2812	78.457	83.5672
1υ2	0.0891	7.6562	78.5586	83.6463
103	0.0656	7.1875	78.7617	83.6516
104	0.0891	8.4375	78.9649	83.6955
105	0.0469	7.1875	78	83.6902
106	0.0422	7.9688	78.8633	83.7219
107	0.0516	8.4375	78.8125	83.6076
108	0.0328	9.0625	79.3203	83.6604
109	0.0234	7.5	78.7109	83.6234
110	0.0234	7.0312	79.0664	83.6551
111	0.0141	8.9062	78.3555	83.583
112	0.0188	7.0312	78.5078	83.6832
113	0.0094	6.7188	78.6094	83.6199
114	0	6.0938	79.4726	83.6375
115	0	8.5938	78.8125	83.6586
116	-0.0047	6.875	78.8633	83.7535
117	-0.0141	6.875	79.2188	83.7025
118	-0.0188	8.9062	77.543	83.7271
119	-0.0563	6.875	78.9141	83.7078
120	-0.0563	7.1875	79.2695	83.7236
121	-0.0609	7.6562	78.7109	83.6937
122	-0.0516	6.7188	78.8125	83.6727
123	-0.0797	7.1875	78.8633	83.6533
124	-0.0609	8.125	78.6601	83.6533
125	-0.0703	7.0312	78.2539	83.6076
126	-0.0891	7.6562	78.9141	83.7219
127	-0.0891	8.2812	78.6094	83.7324
128	-0.0938	7.8125	78.6601	83.7975
129	-0.1031	8.75	78.1016	83.8484
130	-0.1172	6.0938	78.7617	83.7236
131	-0.1031	7.1875	77.9492	83.6393
132	-0.0984	8.125	78.8633	83.7658
133	-0.1078	9.0625	78.8633	83.6937
134	-0.1172	7.3438	78.2031	83.7096
135	-0.1313	8.125	78.1524	83.7113
136	-0.1313	7.6562	79.5234	83.6463
137	-0.1313	8.4375	78.2539	83.685
138	-0.1406	7.1875	83.1289	83.6217
139	-0.1547	5.1562	74.5976	83.6797
140	-0.1594	4.5312	64.7969	83.5514
141	-0.15	4.8438	65.6094	83.6094
142	-0.1453	5.3125	72.5156	83.6199
143	-0.1313	6.5625	71.5508	83.6164
144	-0.1641	9.2188	78.0508	83.6516

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
145	-0.1266	8.9062	77.9492	83.6164
146	-0.1641	7.3438	72.9726	83.6744
147	-0.1688	8.9062	73.0234	83.5971
148	-0.1734	7.9688	77.4922	83.5865
149	-0.1641	8.2812	77.8984	83.5514
150	-0.1875	8.2812	78.457	83.5461
151	-0.1734	9.0625	77.8984	83.525
152	-0.1875	7.9688	78.8633	83.467
153	-0.2016	7.1875	78.8633	83.4424
154	-0.2063	7.8125	78.5078	83.5268
155	-0.2016	8.125	78.6601	83.5584
156	-0.225	8.5938	79.168	83.5654
157	-0.2203	8.2812	78.5586	83.6129
158	-0.2203	8.9062	79.5234	83.5707
159	-0.2109	8.75	78.8633	83.6586
160	-0.2203	6.5625	79.168	83.634
161	-0.225	7.8125	79.168	83.6814
162	-0.2391	7.9688	78.7617	83.6727
163	-0.2297	8.5938	78.9649	83.6656
164	-0.2625	7.5	78.7109	83.7096
165	-0.2484	8.9062	77.6445	83.5953
166	-0.2578	9.0625	78.6601	83.532
167	-0.2719	6.0938	78.5586	83.5971
168	-0.2672	8.9062	78.457	83.5865
169	-0.2906	7.0312	78.2539	83.6252
170	-0.2719	9.0625	79.3711	83.5918
171	-0.2859	7.9688	77.7461	83.5936
172	-0.2813	7.8125	78.1016	83.5777
173	-0.2719	10.1562	78.5586	83.6305
174	-0.2859	9.2188	78.1016	83.5742
175	-0.3094	9.2188	77.9492	83.5479
176	-0.3047	8.125	78.1016	83.5795
177	-0.2953	7.3438	78.0508	83.634
178	-0.3	7.3438	78.7109	83.6533
179	-0.2906	8.125	78.3555	83.6287
180	-0.3234	9.2188	78.2031	83.6393
181	-0.3234	7.6562	78.6601	83.5566
182	-0.3375	9.0625	80.082	83.6656
183	-0.3281	9.6875	73.7851	83.6199
184	-0.3281	5.9375	71.6524	83.5689
185	-0.3516	6.5625	68.0976	83.5953
186	-0.3469	5.7812	64.0859	83.648
187	-0.3234	3.5938	63.2226	83.5443
188	-0.3422	6.7188	63.6289	83.634
189	-0.3422	6.7188	65.2031	83.6533
190	-0.3422	6.0938	64.4414	83.6199
191	-0.3609	6.4062	68.707	83.6199
192	-0.3656	9.0625	72.8203	83.7078

Table A-1. Defuel Drum—Existing Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
193	-0.375	6.7188	74.8516	83.634
194	-0.3844	8.75	77.0859	83.6146
195	-0.3703	5.9375	77.0351	83.583
196	-0.3656	6.7188	77.3906	83.6779
197	-0.375	7.5	77.1875	83.6674
198	-0.3703	6.7188	77.4922	83.6059
199	-0.3797	7.6562	78.5078	83.6164
200	-0.3891	6.875	78.4063	83.6586
201	-0.3797	6.7188	78.6601	83.7482
202	-0.3797	7.8125	78.2539	83.6814
203	-0.3891	7.3438	78.457	83.7764
204	-0.3844	7.3438	77.8476	83.8063
205	-0.375	7.5	78.3555	83.7395
206	-0.3984	7.3438	78	83.7939
207	-0.3891	6.5625	78.1524	83.8063
208	-0.3844	7.5	78.3555	83.8238
209	-0.4031	7.0312	78.0508	83.9187
210	-0.3984	8.75	77.4414	83.7799
211	-0.4031	7.8125	78	83.9434
212	-0.4125	7.1875	77.9492	83.9908
213	-0.4125	7.5	77.7461	84.026
214	-0.4125	7.8125	77.3906	84.0277
215	-0.4266	6.875	78.9141	84.0436
216	-0.4359	7.8125	77.8984	84.0383
217	-0.4359	8.5938	77.6953	84.1121
218	-0.45	8.2812	78	84.0857
219	-0.4453	7.3438	78	84.1648
220	-0.45	6.7188	78.2539	84.1859
221	-0.3703	8.125	81.4024	84.2404
222	-0.4688	5.1562	75.6641	84.2035
223	-0.3703	7.3438	72.7187	84.2562
224	-0.3703	10.3125	82.2149	84.2475
225	-0.375	4.2188	79.5742	84.2105
226	-0.4266	8.5938	71.957	84.2598
227	-0.4031	4.6875	75.7656	84.1965
228	-0.4313	4.6875	63.4258	84.2229
229	-0.4266	6.0938	66.2695	84.2176
230	-0.4266	7.0312	71.1953	84.2932
231	-0.4078	7.0312	77.6445	84.2826
232	-0.45	5.7812	61.8008	84.258
233	-0.4266	6.7188	63.0703	84.3723
234	-0.3563	7.5	73.4805	84.3564
235	-0.3	6.5625	75.6133	84.3793
236	-0.4313	6.7188	72.3633	84.3424
237	-0.3188	5.3125	74.0391	84.2439
238	-0.3375	5.4688	59.7695	84.2281
239	-0.3188	4.375	59.668	84.207
240	-0.2906	6.7188	65.1016	84.1982

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
241	-0.2859	6.4062	67.5899	84.2299
242	-0.2766	5.9375	65.2031	84.251
243	-0.2813	6.0938	63.375	84.3354
244	-0.3094	6.25	64.2891	84.2053
245	-0.2766	5.1562	66.4219	84.2053
246	-0.2578	5.9375	64.6953	84.2281
247	-0.2625	5.625	65.4063	84.2545
248	-0.2531	6.0938	66.2695	84.302
249	-0.2766	5.4688	67.2344	84.309
250	-0.2625	6.5625	66.3203	84.3916
251	-0.3094	6.875	67.4375	84.3143
252	-0.2672	6.25	68.8594	84.3248
253	-0.2531	6.875	68.707	84.3934
254	-0.2813	6.875	70.332	84.3477
255	-0.2672	6.5625	70.8399	84.3582
256	-0.2672	7.6562	72.1601	84.3951
257	-0.2625	8.75	73.1758	84.4004
258	-0.2906	6.7188	72.9219	84.3301
259	-0.2813	6.4062	72.3125	84.3811
260	-0.3047	7.1875	73.2774	84.3705
261	-0.2766	8.125	74.1914	84.3459
262	-0.2813	6.0938	72.0586	24.3828
263	-0.2016	7.6562	71.7539	84.3336
264	-0.1922	7.9688	75.1563	84.4057
265	-0.1922	7.0312	67.4375	84.4215
266	-0.2016	7.3438	67.7422	84.3793
267	-0.2203	6.4062	72.5664	84.4531
268	-0.2344	7.5	72.5664	84.3248
269	-0.2203	8.2812	72.7187	84.2773
270	-0.225	7.5	73.0742	84.3441
271	-0.2297	7.9688	73.4805	84.3002
272	-0.2297	6.5625	72.1601	84.3301
273	-0.2203	7.3438	72.4649	84.2264
274	-0.3281	7.8125	74.1914	84.2264
275	-0.3141	7.0312	73.7344	84.2527
276	-0.3188	8.2812	71.8555	84.1613
277	-0.3375	5.9375	72.4649	84.1191
278	-0.3047	8.9062	73.3789	84.0084
279	-0.2906	6.4062	73.4297	84.0523
280	-0.2953	6.875	71.8555	83.9855
281	-0.2625	5.7812	72.3633	84.026
282	-0.2906	7.5	73.6328	83.8326
283	-0.2813	8.75	73.2774	83.7992
284	-0.2953	7.6562	71.8555	83.8871
285	-0.3	7.9688	72.5664	83.8309
286	-0.2859	6.7188	73.6328	83.7852
287	-0.3047	5.9375	72.3125	83.7324
288	-0.2953	6.7188	71.957	83.6604

Table A-1. Defuel Drum—Existing Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
289	-0.2859	7.5	72.3125	83.6621
290	-0.3281	7.0312	73.9375	83.6709
291	-0.3422	7.6562	73.4805	83.6305
292	-0.3	5.7812	72.668	83.5672
293	-0.3047	6.7188	72.4141	83.5795
294	-0.3047	5.7812	72.9726	83.7254
295	-0.3094	7.8125	72.8711	83.6111
296	-0.3234	6.875	72.2617	83.5232
297	-0.3328	8.4375	72.7187	83.4828
298	-0.3375	6.5625	72.5156	83.4934
299	-0.3281	7.1875	73.125	83.576
300	-0.3422	7.6562	72.9726	83.358
301	-0.3328	7.0312	73.0742	83.4248
302	-0.3	6.5625	72.1601	83.4213
303	-0.3234	7.0312	72.3125	83.5355
304	-0.3047	5.9375	72.8711	83.6305
305	-0.2719	6.0938	71.7539	83.5092
306	-0.2672	5.625	72.668	83.6059
307	-0.2203	6.875	73.0742	83.7043
308	-0.2719	6.25	70.4844	83.7271
309	-0.3141	6.25	70.4336	83.685
310	-0.2766	5.625	72.7187	83.6744
311	-0.3234	7.3438	68.1484	83.7166
312	-0.3047	6.5625	70.1289	83.7131
313	-0.3234	6.7188	68.0469	83.6621
314	-0.3328	6.25	67.5391	83.6463
315	-0.3422	5.9375	69.9766	83.5953
316	-0.3	6.25	69.9766	83.576
317	-0.3281	7.0312	68.6055	83.5971
318	-0.3281	7.8125	70.7383	83.5813
319	-0.3422	7.6562	78.9649	83.6182
320	-0.3328	3.125	48.8516	83.5883
321	-0.3516	3.2812	42.4023	83.6463
322	-0.3563	2.3438	38.1367	83.6621
323	-0.3563	5.1562	46.0078	83.7465
324	-0.3844	2.5	54.793	83.815
325	-0.3609	1.875	38.7969	83.8502
326	-0.3703	0.7812	33.5664	83.8941
327	-0.3703	2.1875	29.6563	83.8678
328	-0.3938	-0.9375	17.9258	83.8414
329	-0.3656	-1.25	4.5195	83.8906
330	-0.3844	-0.625	1.8281	83.9645
331	-0.3609	-1.0937	1.3203	83.9715
332	-0.3703	-0.9375	0.0508	83.9135
333	-0.3656	-0.9375	0.1523	83.8818
334	-0.3609	-1.0937	0.1523	83.8643

Table A-2. Defuel Drum—New Poppet Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	3.1219	3.5938	0.7109	79.3818
2	3.0141	3.2812	28.8437	79.3818
3	2.8922	5.4688	26.7109	79.3924
4	2.7844	8.125	30.2656	79.4082
5	2.6719	5.4688	36.5117	79.2219
6	2.5359	6.25	41.8945	79.3221
7	2.3859	6.5625	47.8867	79.301
8	2.2125	7.5	63.8828	79.3291
9	2.0484	7.3438	66.168	79.2904
10	1.9313	7.1875	65.7109	79.2482
11	1.7859	7.8125	64.7461	79.2852
12	1.6594	7.8125	64.543	79.2658
13	1.5609	7.6562	63.9336	79.3115
14	1.4391	10	70.1797	79.2307
15	1.3172	12.5	85.7188	79.2465
16	1.2047	11.4062	93.2344	79.4082
17	1.0734	12.8125	101.8164	79.315
18	0.9516	10.4688	102.4258	79.3168
19	0.8672	11.4062	94.25	79.3221
20	0.7969	11.875	101.2578	79.2922
21	0.7219	12.0312	94.8594	79.373
22	0.6609	13.125	96.5351	79.2922
23	0.6422	11.5625	98.3633	79.2588
24	0.5859	11.25	97.7031	79.2324
25	0.5578	9.8438	99.3789	79.2025
26	0.5766	11.7188	99.8359	79.2184
27	0.5391	11.875	98.668	79.2535
28	0.5297	12.5	98.8203	79.1428
29	0.5438	12.1875	98.9219	79.1797
30	0.525	11.5625	98.2617	79.1604
31	0.5344	13.125	98.7695	79.1445
32	0.5766	13.9062	99.0742	79.1164
33	0.5813	13.125	99.4297	79.1393
34	0.5766	10.1562	101.3086	79.301
35	0.6141	11.0938	99.582	79.0566
36	0.6	10	101.0547	79.0953
37	0.6	12.5	98.1601	79.0707
38	0.6	12.5	99.3789	79.0373
39	0.5906	10.9375	99.2266	79.1023
40	0.5672	13.5938	100.5469	79.0725
41	0.5344	10.9375	98.8711	79.2184
42	0.5297	12.3438	99.9375	79.1568
43	0.5297	10.7812	97.1953	79.1428
44	0.5203	13.2812	98.8711	79.2078
45	0.5063	11.0938	98.3633	79.1551
46	0.4828	10.625	96.8906	79.1164
47	0.4875	11.5625	98.7695	79.1937
48	0.4922	11.7188	97.8555	79.2271

Table A-2. Defuel Drum—New Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	0.5016	10.4688	98.7695	79.2658
50	0.4781	12.1875	99.0742	79.2729
51	0.4641	12.3438	96.5859	79.2307
52	0.45	11.5625	97.7031	79.2271
53	0.4359	11.5625	96.2305	79.2184
54	0.4313	11.875	98.1094	79.1498
55	0.4406	10.3125	96.8399	79.2395
56	0.4219	11.875	98.6172	79.1797
57	0.3984	12.0312	96.6367	79.2729
58	0.4031	10.1562	99.1758	79.2324
59	0.4031	12.1875	98.3633	79.2746
60	0.3984	12.1875	96.7383	79.2975
61	0.375	12.6562	95.0625	79.3818
62	0.375	12.6562	97.3984	79.315
63	0.3656	12.0312	97.2969	79.2729
64	0.3609	9.0625	97.5	79.2447
65	0.3563	9.8438	96.8399	79.1709
66	0.3281	12.0312	97.4492	79.25
67	0.3188	12.1875	96.7383	79.2289
68	0.3188	11.7188	96.2305	79.3203
69	0.2859	9.375	98.7187	79.3344
70	0.2953	10	98.8203	79.3783
71	0.3141	11.0938	96.0781	79.3273
72	0.2766	10.4688	97.1953	79.3098
73	0.2578	11.4062	97.1953	79.3502
74	0.2766	11.25	96.8906	79.3203
75	0.2625	10.1562	97.8047	79.3098
76	0.2484	12.0312	97.8047	79.3203
77	0.2531	12.9688	94.7578	79.3748
78	0.2625	10.3125	97.3984	79.3063
79	0.2484	10.9375	97.8047	79.3344
80	0.2156	10.7812	96.1797	79.3502
81	0.2109	11.5625	96.8399	79.4082
82	0.2156	12.8125	97.3476	79.41
83	0.1969	11.0938	96.5351	79.3801
84	0.1781	11.0938	96.7891	79.4891
85	0.1734	10.7812	96.7891	79.468
86	0.1641	11.0938	96.7891	79.4082
87	0.1547	10.1562	95.7226	79.4557
88	0.15	10	95.9766	79.5137
89	0.1547	10	95.8242	79.4873
90	0.1547	10.625	96.9414	79.5242
91	0.1453	11.5625	95.875	79.5313
92	0.1219	11.25	95.9766	79.4293
93	0.1219	12.0312	96.0781	79.5541
94	0.1359	11.25	96.6875	79.6191
95	0.1172	10.3125	95.7226	79.6086
96	0.1078	8.5938	96.7383	79.5295

Table A-2. Defuel Drum—New Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.1125	11.0938	95.0117	79.5523
98	0.1125	11.4062	96.1797	79.6121
99	0.1078	11.0938	95.418	79.5488
100	0.0844	10.3125	96.5859	79.533
101	0.0797	11.25	94.9101	79.5189
102	0.0703	10.9375	95.418	79.5049
103	0.0609	10.9375	95.5703	79.5523
104	0.0563	11.5625	95.7734	79.4996
105	0.0516	9.6875	95.9766	79.4662
106	0.0703	10.1562	95.5703	79.424
107	0.0422	9.6875	95.875	79.468
108	0.0375	11.4062	95.0117	79.4363
109	0.0422	11.0938	94.8594	79.4908
110	0.0328	9.375	95.418	79.5049
111	0.0516	11.0938	96.1797	79.4504
112	0.0422	9.0625	94.6562	79.4609
113	0.0328	11.0938	95.9766	79.4574
114	0.0328	11.0938	95.4688	79.4732
115	0.0141	11.0938	94.0976	79.4381
116	-0.0094	10.625	93.3867	79.4697
117	-0.0188	9.6875	93.0312	79.4346
118	0.0234	10.625	93.8945	79.4715
119	0.0188	9.8438	93.640ᶜ	79.5172
120	-0.0188	10.4688	93.2344	79.3836
121	-0.0188	11.25	92.4219	79.4258
122	-0.0234	10.625	93.5899	79.3326
123	-0.0141	9.8438	93.4375	79.3449
124	-0.0234	11.4062	93.3867	79.2834
125	0	9.2188	93.6406	79.3818
126	-0.0188	9.5312	93.3359	79.3572
127	-0.0422	11.0938	93.7422	79.359
128	-0.0375	8.125	93.3359	79.4434
129	-0.0328	10.1562	94.0469	79.3186
130	-0.0609	10	93.5899	79.4187
131	-0.0563	10.9375	93.6406	79.4715
132	-0.0656	10.625	93.2344	79.4328
133	-0.0516	10	93.2851	79.3994
134	-0.075	8.125	93.5899	79.5102
135	-0.0656	9.2188	90.1875	79.5576
136	-0.075	7.9688	87.3945	79.482
137	-0.075	6.25	81.5039	79.5066
138	-0.0891	7.9688	77.7461	79.5611
139	-0.0844	6.5625	75.2578	79.5418
140	-0.1031	5.7812	72.3633	79.6262
141	-0.0984	5.7812	68.3008	79.649
142	-0.0984	5.7812	65.1016	79.4996
143	-0.0891	6.25	64.3399	79.649
144	-0.075	6.5625	63.0195	79.6139

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
145	-0.0938	5.625	62.1055	79.6666
146	-0.0422	8.2812	60.7851	79.6631
147	-0.0656	5.9375	60.6328	79.6771
148	-0.0094	4.2188	56.1641	79.6824
149	-0.0516	7.8125	68.0469	79.6895
150	-0.0469	12.5	94.4531	79.7229
151	-0.075	10.9375	92.0156	79.7439
152	-0.0844	9.6875	91.457	79.7404
153	-0.0656	10.1562	91.7617	79.6385
154	-0.0563	10.1562	92.3711	79.8213
155	-0.0844	10.7812	92.0156	79.751
156	-0.0609	12.0312	92.0664	79.7105
157	-0.075	10.9375	92.2695	79.7492
158	-0.0938	11.5625	92.4726	79.7334
159	-0.0656	8.5938	92.2695	79.6631
160	-0.0703	9.6875	92.5742	79.693
161	-0.0656	10.9375	92.4219	79.6578
162	-0.0891	11.0938	92.3711	79.6666
163	-0.0891	11.875	92.9297	79.591
164	-0.0891	10.9375	92.5234	79.5822
165	-0.0891	10.3125	92.0664	79.6244
166	-0.1172	11.7188	92.168	79.5207
167	-0.1031	11.0938	92.7266	79.6051
168	-0.1313	10.3125	92.8281	79.4943
169	-0.1172	10	93.2344	79.5277
170	-0.0984	10.7812	92.168	79.5242
171	-0.1359	10.7812	92.168	79.5102
172	-0.1031	9.5312	92.4726	79.584
173	-0.0703	10.9375	92.168	79.5682
174	-0.1031	9.375	92.1172	79.5629
175	-0.1078	11.7188	91.9649	79.5822
176	-0.1219	10.4688	92.168	79.5541
177	-0.1125	12.0312	92.4726	79.5717
178	-0.1313	11.25	92.4219	79.5576
179	-0.15	10.7812	91.8633	79.5418
180	-0.1641	11.0938	91.6094	79.5594
181	-0.1594	11.25	91.5078	79.6174
182	-0.1547	10.4688	92.7774	79.6578
183	-0.1594	11.5625	91.457	79.6139
184	-0.1781	11.0938	91.6094	79.5928
185	-0.1875	10.1562	91.9141	79.6314
186	-0.1734	10.3125	92.0664	79.5857
187	-0.2063	9.5312	91.8633	79.5594
188	-0.2109	10.3125	91.457	79.6332
189	-0.2063	8.125	92.0664	79.6561
190	-0.2156	10.9375	91.9649	79.5787
191	-0.2391	9.2188	92.168	79.6877
192	-0.2203	8.9062	92.7266	79.6824

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
193	-0.2391	9.2188	91.9649	79.6543
194	-0.2344	9.6875	92.0664	79.6666
195	-0.2344	10.7812	91.2539	79.6613
196	-0.2578	10.3125	91.3047	79.7141
197	-0.2484	10.9375	91.1524	79.7088
198	-0.2578	9.6875	91.8633	79.6824
199	-0.2531	9.5312	91.4063	79.7264
200	-0.2672	11.25	90.8476	79.7316
201	-0.2719	8.4375	91.9649	79.7334
202	-0.3047	8.9062	91.5078	79.6613
203	-0.2953	8.5938	91.6601	79.6982
204	-0.3094	8.75	91.6094	79.7773
205	-0.2906	10.7812	90.3399	79.6631
206	-0.3094	7.8125	90.7461	79.6174
207	-0.3	8.75	91.5586	79.5928
208	-0.3141	9.8438	90.8476	79.5523
209	-0.3	9.8438	91.2031	79.6561
210	-0.3422	8.75	91.1524	79.5998
211	-0.3188	10	91.5078	79.6648
212	-0.3328	7.9688	90.7461	79.649
213	-0.3656	10.625	90.7461	79.6543
214	-0.3563	10.3125	90.8476	79.5646
215	-0.3609	9.6875	91.5078	79.5664
216	-0.375	10.1562	91.2031	79.526
217	-0.3703	9.375	90.5937	79.5629
218	-0.4125	8.125	91.0508	79.6227
219	-0.3938	9.8438	90.7461	79.6807
220	-0.4078	8.9062	91.457	79.577
221	-0.4219	9.6875	89.832	79.6402
222	-0.4406	10.625	90.6953	79.598
223	-0.4219	11.0938	90.2383	79.6033
224	-0.4453	9.2188	91.5078	79.5893
225	-0.4406	9.6875	90.7461	79.5629
226	-0.4594	10.3125	90.0351	79.591
227	-0.4641	8.9062	90.8476	79.6402
228	-0.4453	9.0625	90.4922	79.6508
229	-0.4688	8.9062	91	79.6244
230	-0.45	9.375	90.4414	79.5471
231	-0.4547	7.8125	90.8476	79.6051
232	-0.4594	10.3125	90.0351	79.6016
233	-0.4547	8.4375	90.8476	79.533
234	-0.4594	9.8438	90.3906	79.6613
235	-0.4875	9.8438	90.8984	79.5559
236	-0.4828	9.375	89.832	79.5945
237	-0.4969	9.6875	90.1875	79.5207
238	-0.487	8.75	89.6289	79.649
239	-0.4688	10	90.1367	79.5383
240	-0.4875	9.8438	89.9336	79.6859

Table A-2. Defuel Drum—New Poppet Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
241	-0.4828	8.9062	90.1875	79.6086
242	-0.4969	9.375	90.2383	79.5893
243	-0.5016	9.375	89.6289	79.6156
244	-0.5016	8.2812	90.0859	79.7105
245	-0.5156	8.5938	90.5937	79.707
246	-0.5109	10	89.9336	79.5699
247	-0.5109	8.9062	90.4414	79.6807
248	-0.525	9.375	90.4414	79.6877
249	-0.5391	10.4688	89.5274	79.642
250	-0.5344	8.9062	90.4414	79.7141
251	-0.525	8.2812	89.7305	79.7053
252	-0.5297	9.5312	91.0508	79.7158
253	-0.5297	5.9375	87.1914	79.6543
254	-0.5438	7.6562	81.5547	79.6613
255	-0.5344	8.4375	78.6601	79.6473
256	-0.5719	9.375	84.9062	79.6824
257	-0.5484	7.6562	84.4492	79.6807
258	-0.5813	9.2188	81.0469	79.7316
259	-0.5813	10.7812	81.0469	79.6561
260	-0.5859	8.9062	80.6914	79.7334
261	-0.5813	7.5	81.5547	79.7176
262	-0.5813	7.9688	81.9101	79.6525
263	-0.5906	7.8125	81.0976	79.7088
264	-0.6	7.5	80.8437	79.6332
265	-0.5953	7.5	80.8945	79.6719
266	-0.6234	7.9688	80.6406	79.6684
267	-0.6	9.8438	80.793	79.6473
268	-0.6141	9.2188	80.4883	79.6789
269	-0.6281	7.8125	80.0313	79.6842
270	-0.6375	7.9688	80.3867	79.6033
271	-0.6328	8.9062	82.5195	79.6438
272	-0.6609	2.0312	77.3906	79.5805
273	-0.6516	0.9375	31.6875	79.5418
274	-0.6609	1.4062	21.9883	79.584
275	-0.6609	0.1562	13.9141	79.4645
276	-0.6656	-0.7812	4.4688	79.5436
277	-0.6656	-0.9375	0.5586	79.5137

Table A-3. Drum Fill—Carter Refuel/Defuel Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	-0.4359	6.5625	0.1523	81.1396
2	-0.4313	7.3438	0.1016	81.1115
3	-0.3984	-0.3125	31.4844	81.043
4	-0.3797	3.125	25.1367	81.1238
5	-0.3984	6.5625	29.5039	81.1238
6	-0.3797	7.0312	49.5117	81.1361
7	-0.3703	10	69.8242	81.1836
8	-0.3797	11.5625	81.0469	81.0693
9	-0.3469	13.9062	90.7461	81.173
10	-0.3234	17.8125	105.9805	81.1027
11	-0.3141	21.875	122.4844	81.2662
12	-0.3188	26.4062	129.6953	81.166
13	-0.2953	28.4375	136.5508	81.1994
14	-0.2859	30.3125	144.0156	81.173
15	-0.2859	31.4062	148.0782	81.1941
16	-0.2438	32.3438	152.2422	81.217
17	-0.2344	34.2188	153.8164	81.1977
18	-0.2016	32.6562	154.6797	81.2187
19	-0.1547	37.3438	163.8711	81.2205
20	-0.1969	37.1875	165.6992	81.1994
21	-0.1875	38.125	165.4453	81.2117
22	-0.1734	40.3125	169.5586	81.1643
23	-0.2063	42.0312	173.6211	81.2275
24	-0.2203	42.0312	176.3633	81.1713
25	-0.1969	42.0312	177.0742	81.1432
26	-0.1922	42.0312	177.2774	81.173
27	-0.1969	43.125	177.9883	81.1484
28	-0.1781	43.2812	178.3438	81.1977
29	-0.1922	42.9688	178.2422	81.1502
30	-0.1594	43.9062	178.3946	81.1818
31	-0.1734	42.6562	178.4961	81.2398
32	-0.1547	42.3438	178.2929	81.2697
33	-0.1641	42.5	178.8008	81.2803
34	-0.15	42.6562	178.4961	81.2768
35	-0.1547	43.5938	178.4453	81.4068
36	-0.1688	41.0938	178.1406	81.2838
37	-0.1875	42.8125	178.0899	81.3471
38	-0.1594	42.1875	178.2929	81.3734
39	-0.1406	43.125	178.2929	81.4016
40	-0.1688	43.9062	178.4961	81.4121
41	-0.1688	42.6562	178.2422	81.4174
42	-0.1266	42.6562	178.3438	81.4508
43	-0.1453	42.6562	178.0899	81.4314
44	-0.1594	42.9688	178.3438	81.4314
45	-0.1359	44.2188	178.3946	81.5158
46	-0.1406	41.875	177.9375	81.4736
47	-0.1641	42.6562	178.2929	81.4895
48	-0.1313	42.9688	178.2422	81.4561

Table A-3. Drum Fill—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	-0.1078	42.9688	178.3946	81.5334
50	-0.0938	42.6562	178.2929	81.551
51	-0.0797	42.3438	178.5469	81.5984
52	-0.0938	43.125	178.3438	81.6213
53	-0.1031	42.5	177.9883	81.6881
54	-0.075	43.125	178.5469	81.7373
55	-0.0984	42.8125	178.4453	81.7443
56	-0.0516	42.3438	178.039	81.827
57	-0.0656	42.3438	177.9883	81.8393
58	-0.0844	43.2812	177.8867	81.834
59	-0.0328	43.9062	178.039	81.8182
60	-0.0469	42.8125	178.4453	81.9201
61	-0.0375	42.8125	178.2422	81.8621
62	-0.1078	43.125	178.2929	81.8744
63	-0.0563	42.8125	177.8867	81.8586
64	-0.0703	42.1875	178.2422	81.8814
65	-0.0891	42.6562	178.2422	81.8604
66	-0.0891	43.2812	178.039	81.899
67	-0.1125	42.6562	178.0899	81.827
68	-0.1406	43.9062	178.1914	81.8568
69	-0.1313	42.9688	178.2929	81.8217
70	-0.1172	42.0312	178.2422	81.9395
71	-0.1406	43.125	177.9375	81.8094
72	-0.15	43.9062	177.8867	81.8094
73	-0.1266	42.5	178.039	81.8621
74	-0.1453	43.4375	177.7344	81.9201
75	-0.1313	42.8125	177.9375	81.8691
76	-0.1406	42.5	178.3438	81.9324
77	-0.1406	42.3438	178.1914	81.9131
78	-0.1406	42.3438	177.8867	81.9289
79	-0.1078	43.9062	177.7851	81.8568
80	-0.0938	42.9688	177.7851	81.8938
81	-0.0516	42.8125	177.5821	81.9482
82	-0.0797	43.75	177.6836	81.9113
83	-0.1547	41.5625	177.4804	81.8445
84	-0.1031	42.6562	177.6328	81.95
85	-0.1172	43.5938	177.4804	81.9922
86	-0.1406	42.6562	177.4804	81.9096
87	-0.1359	42.9688	177.6836	81.9588
88	-0.1078	42.6562	177.7344	81.9271
89	-0.15	41.5625	177.5821	81.8656
90	-0.1172	42.0312	177.5313	81.841
91	-0.1313	43.9062	177.5313	81.8832
92	-0.1547	43.125	177.6328	81.8059
93	-0.1031	42.1875	177.2774	81.8305
94	-0.1406	42.3438	177.2774	81.8639
95	-0.1406	42.5	177.0742	81.8656
96	-0.0984	43.4375	176.7696	81.7936

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	-0.1172	42.0312	176.7696	81.8146
98	-0.0938	42.6562	177.0742	81.841
99	-0.0703	41.7188	177.125	81.8656
100	-0.0797	42.1875	177.0235	81.8568
101	-0.0656	43.125	177.0235	81.8533
102	-0.0422	43.125	176.8711	81.885
103	-0.0281	42.3438	177.0742	81.8762
104	-0.0797	42.1875	176.8711	81.841
105	-0.0656	43.5938	176.8711	81.8604
106	-0.0094	42.8125	176.6679	81.8006
107	0.0563	42.1875	176.1093	81.7285
108	0.0375	42.1875	176.6172	81.7602
109	0.1828	42.1875	176.5156	81.8445
110	0.0938	43.125	176.211	81.7725
111	0.1125	42.8125	175.8554	81.7777
112	0.1594	41.4062	176.1093	81.7197
113	0.1969	43.2812	176.3125	81.7109
114	0.2906	42.5	176.414	81.7338
115	0.2625	42.8125	176.4649	81.718
116	0.3328	42.0312	176.0078	81.7391
117	0.3797	42.6562	176.3633	81.7936
118	0.3891	43.125	176.6679	81.7672
119	0.4922	42.5	176.8203	81.7566
120	0.4828	42.0312	176.3633	81.8498
121	0.5813	42.6562	176.211	81.8375
122	0.5719	43.75	176.1601	81.7654
123	0.6281	43.125	175.8554	81.848
124	0.7125	41.875	175.8047	81.8129
125	0.7969	42.3438	175.7539	81.8094
126	0.75	42.6562	175.2461	81.8463
127	0.8109	43.125	175.2969	81.8199
128	0.8016	42.5	175.3476	81.8779
129	0.8344	42.3438	175.3476	81.8146
130	0.8109	42.3438	175.3476	81.8533
131	0.8578	43.2812	175.3985	81.8744
132	0.9891	42.9688	175.5	81.8586
133	0.9656	42.1875	175.2969	81.8252
134	1.0078	43.2812	175.3476	81.9465
135	1.1156	26.7188	147.8242	81.9113
136	1.1578	27.1875	141.6289	81.9799
137	1.2516	26.4062	139.9024	81.9113
138	1.3594	27.8125	139.6485	81.943
139	1.4813	28.2812	139.4453	81.9447
140	1.6266	27.3438	138.7851	81.9201
141	1.7625	26.875	138.4804	81.8533
142	1.9078	28.4375	138.4297	81.9219
143	2.1469	28.5938	137.9726	81.9869
144	2.2359	24.375	131.6758	81.9852

Table A-3. Drum Fill—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
145	2.4234	23.4375	129.2891	81.9447
146	2.6156	23.4375	128.4258	82.0748
147	2.8688	23.4375	127.5625	82.0133
148	3.1219	24.375	125.9883	81.9377
149	3.4031	24.8438	123.7031	82.0256
150	3.7547	23.125	121.7735	81.9746
151	4.0828	20.9375	114.7656	82.0994
152	4.3969	23.9062	104.711	82.0168
153	4.6453	34.6875	70.2305	81.9711
154	4.5516	31.875	5.5352	81.9816
155	4.5141	32.6562	0.457	82.0977
156	4.4813	32.1875	0.3047	81.9781
157	4.4438	31.5625	0.1523	81.9957
158	4.4063	32.1875	0.0508	82.059
159	4.3922	31.4062	0	82.0432
160	4.3641	30.9375	0.1523	82.0115

Table A-4. Drum Fill—Carter Refuel/Defuel Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	-0.1359	6.875	37.4258	81.9465
2	-0.1406	4.0625	37.4258	81.9482
3	-0.15	4.8438	37.3242	81.9324
4	-0.1547	6.7188	37.1719	81.9605
5	-0.1359	5	37.5273	82.0186
6	-0.1547	7.3438	37.1211	81.9359
7	-0.1734	4.375	37.0703	81.9834
8	-0.1453	10	41.1328	82.0062
9	-0.1453	14.375	74.75	81.9746
10	-0.1453	20.4688	109.2305	82.0326
11	-0.1641	23.5938	122.332	82.0238
12	-0.1453	27.5	135.2812	82.0238
13	-0.1359	28.9062	147.4179	82.0449
14	-0.15	30.625	148.9922	81.9729
15	-0.1406	33.125	159.1992	82.0555
16	-0.1453	35.9375	162.3476	81.9535
17	-0.1594	35	163.1601	82.0783
18	-0.15	33.4375	160.6211	82.0062
19	-0.1547	35.4688	165.5976	81.9711
20	-0.1453	35.3125	164.4804	82.0273
21	-0.1594	34.2188	161.789	82.0854
22	-0.1219	32.1875	159.6054	82.0203
23	-0.1406	32.1875	158.0313	82.0555
24	-0.15	30.9375	156.8633	82.073
25	-0.1266	32.6562	155.8985	82.0625
26	-0.1219	32.5	155.086	92.0572
27	-0.1359	32.1875	154.0703	82.1188
28	-0.1266	29.8438	153.2071	82.0783
29	-0.1172	30	151.9883	82.1311
30	-0.1406	30.3125	151.0742	82.0889
31	-0.1172	30	150.4649	82.1012
32	-0.1266	28.2812	149.5	82.0906
33	-0.1219	30.1562	149.2461	82.1012
34	0.0234	29.5312	148.3828	82.0977
35	-0.2484	29.2188	147.6719	82.066
36	-0.2344	28.75	146.7578	82.0607
37	-0.2438	28.4375	146.1485	82.0889
38	-0.2438	28.75	145.7422	82.0994
39	-0.2531	27.9688	145.4375	82.1152
40	-0.2438	27.3438	144.9804	82.0572
41	-0.2484	28.2812	144.7265	82.0889
42	-0.2719	27.9688	144.7774	82.1328
43	-0.2625	27.3438	144.1172	82.0854
44	-0.2484	28.5938	143.6601	82.2049
45	-0.2719	27.3438	143.0508	82.1029
46	-0.2391	28.5938	142.5938	82.1662
47	-0.2578	27.5	142.6953	82.1152
48	-0.2297	27.5	142.6953	82.1469

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	-0.2484	27.5	142.4922	82.1539
50	-0.2391	26.875	142.4414	82.1627
51	-0.2438	27.6562	142.1875	82.2119
52	-0.2625	27.5	141.4765	82.2172
53	-0.2344	26.0938	141.375	82.233
54	-0.2344	27.1875	140.8164	82.2805
55	-0.2156	27.8125	140.8672	82.2963
56	-0.2297	27.3438	140.664	82.3139
57	-0.225	26.5625	140.5117	82.3912
58	-0.225	26.0938	140.4101	82.2787
59	-0.2063	27.0312	140.5117	82.3314
60	-0.2297	27.3438	140.1563	82.2998
61	-0.1781	27.1875	140.0547	82.2805
62	-0.2156	27.6562	139.9532	82.3596
63	-0.2063	26.7188	139.9532	82.3648
64	-0.1969	26.875	139.6485	82.407
65	-0.1875	26.4062	139.5976	82.3859
66	-0.1688	21.25	133.1992	82.4914
67	-0.1266	36.5625	155.086	82.4809
68	-0.1594	42.0312	174.586	82.5459
69	-0.15	43.5938	180.1719	82.4984
70	-0.1266	43.4375	180.9336	82.5564
71	-0.1359	44.2188	181.086	82.4949
72	-0.1266	43.9062	181.1367	82.5828
73	-0.1125	42.0312	180.7304	82.5107
74	-0.0375	42.6562	180.5782	82.5846
75	-0.0516	42.5	180.4765	82.6074
76	-0.0516	43.125	180.8321	82.6127
77	0.0188	43.4375	180.4765	82.6303
78	-0.0141	42.9688	180.7304	82.7797
79	0.0141	43.75	180.3242	82.6672
80	0.0938	42.6562	180.2735	82.6531
81	0.0141	43.75	180.3242	82.6461
82	0.1266	42.9688	180.375	82.6953
83	0.1313	41.875	180.375	82.6971
84	0.1781	43.4375	180.1719	82.7463
85	0.2016	43.4375	180.375	82.7164
86	0.1359	42.6562	180.2735	82.7375
87	0.1547	43.5938	180.1211	82.7129
88	0.2484	43.125	180.1719	82.7445
89	0.2813	43.4375	180.4258	82.7762
90	0.4172	44.0625	179.9688	82.8148
91	0.375	43.4375	180.1719	82.8307
92	0.3422	43.4375	180.1719	82.8465
93	0.3797	41.7188	180.1719	82.8166
94	0.45	42.6562	180.1719	82.8061
95	0.4781	42.0312	179.7149	82.8693
96	0.5063	43.75	179.9179	82.7393

Table A-4. Drum Fill—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.5016	44.2188	179.9688	82.8447
98	0.5203	42.5	179.664	82.8834
99	0.5672	43.9062	179.5117	82.857
100	0.6234	43.9062	179.8164	82.9713
101	0.675	44.2188	179.461	82.9098
102	0.7125	42.6562	179.6133	82.9572
103	0.7594	42.9688	179.5625	82.9221
104	0.9094	42.6562	179.1054	82.9572
105	1.0359	43.4375	179.1562	82.9748
106	1.2703	43.75	178.9024	82.9766
107	1.4344	37.9688	170.4726	82.9977
108	1.5094	38.5938	166.3086	83.0082
109	1.6875	38.75	165.5976	83.01
110	1.9125	36.7188	165.1407	83.0469
111	2.0438	36.875	163.9726	83.0223
112	2.3438	37.0312	162.9063	83.0434
113	2.6016	37.5	161.9414	83.0223
114	3.0234	37.8125	161.1797	82.9379
115	3.3563	37.0312	160.164	82.966
116	3.8156	38.75	157.7265	82.9133
117	4.2	36.7188	116.8985	82.8834
118	4.1531	30	15.0313	82.8904
119	4.0828	29.6875	1.0156	82.9941
120	4.0313	29.375	-0.0508	82.9098

Table A-5. Drum Fill—Carter Refuel/Defuel Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	-0.1078	5.9375	0.2539	83.525
2	-0.0984	4.0625	11.7305	83.5057
3	-0.1219	5.3125	39.0508	83.4951
4	-0.0984	5	39.6602	83.4916
5	-0.0938	5.1562	37.9336	83.5074
6	-0.1031	5.1562	36.8164	83.4828
7	-0.075	11.5625	51.2891	83.4318
8	-0.0797	11.0938	72.4649	83.3158
9	-0.0938	13.75	81.6563	83.2174
10	-0.0891	15.625	88.8672	83.2191
11	-0.0656	25	115.9336	83.1102
12	-0.0516	24.0625	127.9688	83.1611
13	-0.0703	27.3438	131.1679	83.1418
14	-0.0469	34.6875	151.3789	83.1102
15	-0.0656	37.1875	164.836	83.0697
16	-0.0563	29.2188	154.6289	82.9924
17	-0.0563	28.75	147.5703	82.9924
18	-0.0234	27.9688	145.9453	82.8535
19	-0.0141	27.5	144.2187	82.8588
20	0	27.6562	142.7969	82.785
21	-0.0281	27.0312	141.6289	82.7551
22	-0.0047	26.25	140.9179	82.7305
23	-0.0141	25.7812	140.2071	82.7463
24	0	25.7812	139.3946	82.6303
25	0.0094	26.0938	139.1914	82.6988
26	0	25.4688	138.7851	82.6373
27	0.0094	25.3125	138.4297	82.6707
28	0.0281	25.7812	137.7696	82.6654
29	0.0234	25.1562	136.9571	82.6443
30	0.0141	25.625	136.2461	82.5424
31	0.0469	24.6875	135.7383	82.5635
32	0.0375	25.625	135.2812	82.4334
33	0.0328	24.0625	134.6211	82.3561
34	0.0422	24.0625	134.0625	82.3824
35	0.0563	25.4688	133.3515	82.3033
36	0.0328	24.0625	132.7422	82.2752
37	0.0656	24.375	131.6758	82.2805
38	0.0609	22.5	130.8125	82.2348
39	0.0703	24.0625	129.543	82.2277
40	0.0609	23.2812	128.9336	82.2559
41	0.0516	22.9688	128.3242	82.2576
42	0.0844	22.5	127.461	82.1996
43	0.075	22.6562	126.8516	82.1891
44	0.0844	23.125	126.4453	82.233
45	0.0891	21.5625	125.8867	82.1908
46	0.0938	21.5625	125.7344	82.2488
47	0.0797	21.7188	125.0742	82.24
48	0.1031	21.25	124.4141	82.1223

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	0.0984	20.625	124.1602	82.2629
50	0.0984	20.9375	124.3633	82.2207
51	0.1172	21.0938	123.957	82.2154
52	0.1172	21.0938	123.8047	82.2945
53	0.1219	21.25	123.5508	82.1592
54	0.1219	22.6562	123.4492	82.233
55	0.1266	22.3438	123.2461	82.2506
56	0.1313	21.4062	123.043	82.2805
57	0.1219	20.9375	122.9414	82.2453
58	0.1359	20.3125	122.6875	82.1398
59	0.1219	21.875	122.4336	82.168
60	0.1594	21.25	122.4336	82.1117
61	0.15	21.0938	122.3828	82.1592
62	0.1266	20.625	122.0781	82.1381
63	0.1594	21.875	122.0273	82.0836
64	0.1688	21.5625	122.1289	82.0836
65	0.1734	20.4688	121.9766	82.0783
66	0.1453	21.4062	121.7735	82.0432
67	0.1641	21.4062	121.9766	82.0133
68	0.1781	21.25	122.1289	82.0818
69	0.1828	20.625	122.0273	81.9816
70	0.1828	22.3438	121.875	82.0291
71	0.1969	21.7188	121.875	82.0625
72	0.2109	20.4688	121.5703	81.9992
73	0.2531	21.875	121.5703	81.9992
74	0.2438	20.7812	121.6719	82.0273
75	0.2203	20.4688	121.5195	82.1223
76	0.2438	21.7188	121.3164	82.1486
77	0.2719	21.5625	121.3164	82.0766
78	0.2813	20.9375	121.1641	82.1363
79	0.2906	21.5625	121.2148	82.117
80	0.2859	22.5	120.961	82.2207
81	0.3375	20.1562	121.2148	82.1732
82	0.2906	21.25	120.6562	82.168
83	0.2953	21.0938	120.7578	82.1926
84	0.3234	22.0312	120.3516	82.2154
85	0.3141	21.875	120.7578	82.1891
86	0.3094	20.4688	120.6562	82.2225
87	0.3281	22.0312	120.3008	82.2594
88	0.3469	20.3125	120.6055	82.2506
89	0.3797	22.1875	120.4531	82.2611
90	0.3938	21.7188	120.5547	82.2717
91	0.3469	20.9375	120.6055	82.2717
92	0.3609	20.625	120.707	82.3385
93	0.3656	20.3125	120.4531	82.2875
94	0.4172	21.875	120.1485	82.2629
95	0.3375	20.9375	120.1485	82.3033
96	0.3516	21.5625	119.6406	82.3139

Table A-5. Drum Fill—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.3984	20.9375	119.9961	82.3297
98	0.3703	20.9375	119.8945	82.2963
99	0.4547	21.5625	119.7422	82.3473
100	0.4266	20.625	119.7422	82.3859
101	0.4594	21.0938	119.6406	82.3807
102	0.5016	21.4062	119.793	82.3297
103	0.4313	21.25	119.4883	82.3455
104	0.4453	21.25	119.6406	82.4018
105	0.4219	21.5625	119.2852	82.3982
106	0.4406	20.625	119.3867	82.4633
107	0.4172	21.4062	119.3867	82.4791
108	0.4406	21.4062	119.1836	82.4492
109	0.4078	20.9375	119.2852	82.5266
110	0.4594	21.4062	119.1328	82.5652
111	0.4641	20.4688	118.9297	82.5283
112	0.5344	21.5625	119.1328	82.5723
113	0.4781	20.7812	118.8789	82.5195
114	0.5484	22.0312	118.0664	82.516
115	0.5391	20.625	118.7266	82.465
116	0.5906	24.5312	127.0547	82.5424
117	0.6047	25.1562	129.8985	82.4457
118	0.6609	24.0625	130.1524	82.4756
119	0.6234	23.9062	128.6797	82.458
120	0.675	23.5938	127.1562	82.4158
121	0.675	23.75	126.1914	82.3684
122	0.6938	21.875	125.4805	82.3912
123	0.6938	22.8125	125.125	82.4281
124	0.7219	23.2812	124.9219	82.4281
125	0.6797	22.6562	124.5664	82.4668
126	0.7922	23.2812	124.1094	82.393
127	0.7969	22.6562	124.211	82.4475
128	0.8484	22.0312	124.0586	82.3789
129	0.8484	23.125	123.7539	82.3648
130	0.9563	23.2812	123.4492	82.465
131	1.0547	23.125	123.2969	82.4773
132	1.0922	21.7188	122.6367	82.4193
133	1.2	22.0312	122.6367	82.3631
134	1.3359	22.1875	121.7227	82.3209
135	1.425	22.5	121.875	82.2559
136	1.6172	22.5	121.0625	82.284
137	1.6875	22.9688	120.5547	82.2629
138	1.8516	22.9688	120.1992	82.2594
139	2.0016	22.9688	119.6406	82.2646
140	2.1516	23.75	119.2344	82.1873
141	2.3719	23.125	118.9805	82.0854
142	2.5453	22.9688	118.2187	82.1434
143	2.7891	23.4375	117.457	82.1627
144	3.0234	23.4375	116.9492	82.1627

Table A-5. Drum Fill—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
145	3.2578	23.75	115.8828	82.1398
146	3.5672	23.125	115.375	82.2436
147	3.8813	23.4375	114.6133	82.2137
148	4.2328	23.4375	113.8008	82.1504
149	4.5891	23.5938	113.0898	82.1486
150	4.9266	23.9062	111.9727	82.1592
151	5.3109	22.8125	111.1602	82.1645
152	5.6813	23.2812	109.8906	82.1979
153	6.0703	22.8125	108.8242	82.3402
154	6.4594	22.5	107.6055	82.1627
155	6.8344	22.9688	106.4375	82.2594
156	7.2703	23.2812	105.1172	82.1715
157	7.6219	18.5938	102.9336	82.1768
158	7.725	7.0312	34.9375	82.0695
159	7.6875	6.0938	7.2617	81.9957
160	7.5938	5.9375	0.7617	82.0502

Table A-6. Drum Fill—Carter Refuel/Defuel Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	-0.1781	-1.5625	0.1016	82.6672
2	-0.2016	3.5938	8.8867	82.6162
3	-0.1828	3.75	14.2188	82.5512
4	-0.2016	5.4688	18.6367	82.5758
5	-0.1875	4.375	6.7539	82.5723
6	-0.1781	4.375	7.2617	82.567
7	-0.1781	4.375	9.2422	82.5564
8	-0.1828	4.0625	16.7578	82.5424
9	-0.1875	3.9062	16.1992	82.5424
10	-0.1828	4.2188	15.793	82.6092
11	-0.1734	4.5312	18.2813	82.5336
12	-0.1781	4.5312	19.2969	82.5811
13	-0.1922	4.375	19.7539	82.6021
14	-0.1828	4.375	20.6172	82.567
15	-0.1734	4.375	21.1758	82.5195
16	-0.2063	4.5312	21.8867	82.5898
17	-0.1688	4.8438	21.9883	82.4422
18	-0.1969	5.1562	23.1562	82.5494
19	-0.1641	9.2188	29.3516	82.5758
20	-0.1594	10.9375	70.4844	82.5125
21	-0.1688	18.9062	111.5156	82.5547
22	-0.1547	20	120.0469	82.567
23	-0.1453	21.875	121.2148	82.4879
24	-0.1453	20.625	120.5547	82.509
25	-0.1359	24.0625	121.9766	82.3965
26	-0.15	25.3125	132.0313	82.4334
27	-0.1266	29.2188	143.5586	82.4809
28	-0.1359	32.8125	152.9024	82.3508
29	-0.1125	34.2188	162.1446	82.3561
30	-0.1125	38.9062	169.8125	82.4035
31	-0.0984	44.375	179.8164	82.4457
32	-0.1031	42.6562	181.5937	82.4053
33	-0.1031	45.3125	181.6953	82.4176
34	-0.0703	43.2812	181.7969	82.3016
35	-0.0656	44.6875	181.6953	82.4193
36	-0.0656	43.5938	181.7461	82.3754
37	-0.0609	43.2812	181.7461	82.3402
38	-0.0422	44.2188	181.7969	82.4387
39	-0.0469	43.125	182	82.3314
40	-0.0516	43.2812	181.4922	82.4457
41	-0.0375	42.8125	181.8985	82.3859
42	-0.0328	43.5938	181.4414	82.3648
43	-0.0141	44.0625	182.2032	82.4334
44	0	43.2812	182	82.4176
45	0.0188	42.9688	182.0508	82.4193
46	0.0234	42.1875	181.8476	82.465
47	-0.0047	44.375	182.1015	82.4563
48	0.0328	43.125	182	82.4984

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	0.0094	43.9062	182.2032	82.567
50	0.0328	43.2812	181.5937	82.5055
51	0.0375	43.125	182.3554	82.5441
52	0.075	42.8125	182.1524	82.5072
53	0.1078	43.2812	181.7969	82.5441
54	0.0844	44.2188	182.1524	82.5441
55	0.0984	42.3438	182.1524	82.6039
56	0.0891	44.0625	181.7969	82.618
57	0.1078	43.5938	181.289	82.6057
58	0.1219	43.125	181.5429	82.6215
59	0.1125	33.9062	164.6328	82.6637
60	0.1313	32.8125	161.4336	82.6531
61	0.1313	33.2812	160.7226	82.6971
62	0.1406	26.7188	161.7383	82.6865
63	0.1406	25.3125	140.7149	82.6725
64	0.1781	25	137.8203	82.6777
65	0.1641	25	137.4649	82.625
66	0.1875	25.7812	136.7539	82.6953
67	0.1828	28.2812	141.5274	82.5652
68	0.2016	32.9688	153.8672	82.7551
69	0.1828	36.5625	162.2461	82.7287
70	0.2203	37.1875	169.0508	82.7445
71	0.2297	40.3125	173.7735	82.8078
72	0.2391	40.625	176.4649	82.7516
73	0.2391	40.4688	176.5156	82.6988
74	0.2859	40.3125	176.4649	82.7322
75	0.3	40.4688	176.4649	82.7727
76	0.2813	40	176.3633	82.8254
77	0.3141	40.625	176.160J	82.8061
78	0.3094	40.3125	176.3633	82.8957
79	0.3328	40.625	176.1093	82.792
80	0.3328	41.25	176.211	82.7973
81	0.3563	39.6875	175.7032	82.8201
82	0.3703	40.9375	176.1601	82.8201
83	0.4219	40.7812	176.414	82.8412
84	0.4313	41.875	176.1601	82.8166
85	0.4781	41.4062	176.3633	82.7814
86	0.5016	41.0938	175.8554	82.8271
87	0.4781	40.4688	176.211	82.7199
88	0.5391	40.4688	176.1601	82.7621
89	0.5156	40.7812	175.9571	82.7164
90	0.5063	41.4062	175.5	82.5705
91	0.5203	40.625	175.4492	82.7164
92	0.5531	40.9375	175.1953	82.5986
93	0.5531	40.4688	174.9414	82.6865
94	0.5438	42.0312	175.0429	82.6285
95	0.5531	39.5312	174.2304	82.5529
96	0.5953	39.6875	174.4336	82.6479

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.7266	41.25	174.3828	82.5582
98	0.7828	40.4688	174.586	82.5336
99	0.7641	39.5312	173.9765	82.5652
100	0.7828	41.25	174.1289	82.4756
101	0.8438	39.5312	173.9765	82.4264
102	0.8344	40.3125	173.4179	82.4105
103	0.9141	39.0625	173.4179	82.4053
104	0.9188	40.3125	173.3672	82.3068
105	0.9938	40.625	173.5703	82.2664
106	0.9984	39.8438	173.0625	82.2137
107	1.0641	39.6875	173.0117	82.3561
108	1.1156	39.5312	172.7071	82.2646
109	1.1859	39.2188	172.4532	82.2119
110	1.275	39.5312	171.8438	82.2699
111	1.4391	33.5938	169.4063	82.233
112	1.5656	29.0625	153.5117	82.2664
113	1.6734	29.8438	149.8554	82.1979
114	1.8188	25.625	140.7656	82.2312
115	1.9547	25.9375	135.586	82.2207
116	2.1844	25.9375	134.1133	82.2734
117	2.3063	27.0312	133.0468	82.2049
118	2.5078	26.875	132.6914	82.2594
119	2.7375	24.8438	131.8282	82.3262
120	2.9813	26.0938	131.5235	82.2084
121	3.2813	26.5625	129.543	82.3385
122	3.5531	24.8438	125.3281	82.3332
123	3.8438	21.5625	116.4922	82.2682
124	4.1016	20.9375	113.8516	82.2945
125	4.4578	22.3438	113.3945	82.3209
126	4.8	22.9688	112.2773	82.4176
127	5.1609	23.75	111.3633	82.3965
128	5.5266	23.9062	110.3477	82.3648
129	5.8781	24.0625	109.6367	82.3438
130	6.2484	24.8438	108.2656	82.4246
131	6.6469	23.75	106.2852	82.3244
132	7.0125	22.6562	102.7813	82.3561
133	7.2	4.375	50.7813	82.4826
134	7.125	5.1562	5.8398	82.4105
135	7.0547	5.3125	0.5586	82.4563

Table A-7. Defuel Drum—Carter Refuel/Defuel Valve

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
1	3.5297	-0.9375	0.9141	81.1291
2	3.4594	1.5625	7.4648	81.0377
3	3.3422	2.3438	25.6445	81.057
4	3.2484	3.9062	26.9141	80.9428
5	3.1641	3.5938	28.9453	80.9445
6	3.0234	6.0938	41.6406	80.9041
7	2.8594	7.5	49.8164	80.8795
8	2.7281	9.2188	55.3516	80.8479
9	2.5641	9.8438	70.4844	80.9938
10	2.3953	10.9375	82.6211	80.8549
11	2.2078	12.8125	86.2774	80.9691
12	1.9969	12.9688	101.207	80.9973
13	1.8469	10.3125	101.1562	80.9674
14	1.6828	11.7188	103.8984	80.9604
15	1.5797	11.875	100.4453	80.9779
16	1.4484	15.7812	98.7695	80.9779
17	1.3078	11.875	102.3242	80.9586
18	1.2375	12.1875	96.9414	81.0113
19	1.1625	11.875	102.2226	80.934
20	1.0969	10.9375	100.8516	80.9182
21	0.9984	11.7188	101.5117	80.9076
22	0.9609	10.7812	102.9336	80.9305
23	0.9328	10.7812	102.5274	80.8057
24	0.9141	10.7812	102.375	80.8391
25	0.8438	11.5625	100.9531	80.7494
26	0.8344	13.4375	101.2578	80.7881
27	0.7922	11.875	102.375	80.8092
28	0.7922	9.6875	99.3281	80.8109
29	0.7781	10.3125	99.2266	80.7582
30	0.75	9.5312	99.3281	80.7178
31	0.4781	10.1562	100.1914	80.6721
32	0.4453	8.75	100.0899	80.651
33	0.6328	12.6562	99.2774	80.7354
34	0.5859	9.8438	98.7695	80.7406
35	0.5906	11.875	99.2774	80.7617
36	0.5813	10.4688	99.2774	80.665
37	0.5484	11.7188	99.2266	80.7688
38	0.5297	10.4688	99.0234	80.7125
39	0.5344	10.625	99.0234	80.7301
40	0.4969	12.0312	98.3125	80.651
41	0.5625	12.1875	98.5664	80.709
42	0.5344	10	98.7695	80.7266
43	0.5297	10.7812	99.1758	80.7072
44	0.5297	10.1562	98.7187	80.8057
45	0.5063	10.625	100.0391	80.6914
46	0.4969	11.5625	99.6328	80.818
47	0.4875	11.25	98.9726	80.8127
48	0.4781	10	99.6328	80.7934

Table A-7. Defuel Drum—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
49	0.4453	10.9375	98.3633	80.8145
50	0.4547	10.625	98.7695	80.8566
51	0.4266	11.25	98.7695	80.832
52	0.4125	11.875	98.5664	80.9568
53	0.4453	10.7812	98.7187	80.9217
54	0.4172	13.5938	99.4297	80.9533
55	0.4172	11.5625	99.2774	80.9604
56	0.4219	11.25	99.3789	81.0236
57	0.4453	9.0625	99.6836	81.0043
58	0.4125	10	99.4297	81.0658
59	0.3938	11.4062	99.2266	80.9586
60	0.4219	10	99.1758	80.9902
61	0.4078	12.0312	99.0234	80.9428
62	0.3891	10.3125	99.2774	80.9041
63	0.4313	10.9375	99.3789	80.8637
64	0.3938	10.7812	99.2266	80.9041
65	0.3891	10.625	99.582	80.8232
66	0.3938	10.3125	99.8867	80.8918
67	0.3703	12.5	99.3789	80.8566
68	0.3656	10.1562	99.1758	80.9041
69	0.3938	11.4062	100.1406	80.8637
70	0.3563	10.7812	99.8359	80.8619
71	0.3516	11.875	100.2422	80.9287
72	0.3703	10.1562	99.1758	80.8426
73	0.3609	12.6562	99.4297	80.8443
74	0.3234	10.3125	100.3945	80.8285
75	0.3422	10.9375	100.1914	80.8918
76	0.3234	10.7812	100.8008	80.767
77	0.3188	8.9062	100.6992	80.7318
78	0.3234	10.4688	100.293	80.7406
79	0.3188	10.9375	100.2422	80.7898
80	0.3	11.0938	100.6992	80.818
81	0.3234	9.375	100.0391	80.6088
82	0.2719	11.0938	99.4297	80.7318
83	0.2906	9.5312	100.2422	80.6791
84	0.2859	11.875	99.1758	80.7406
85	0.2672	10.9375	99.4805	80.6809
86	0.2672	10.7812	100.6484	80.6914
87	0.2906	10.9375	100.0391	80.6932
88	0.2391	11.875	99.9883	80.6158
89	0.2391	10.3125	99.9883	80.5842
90	0.2531	12.5	99.4297	80.6527
91	0.225	11.4062	99.582	80.6176
92	0.2391	11.7188	100.2422	80.6088
93	0.2391	10.625	99.2774	80.5982
94	0.1969	9.0625	99.8867	80.5543
95	0.2344	9.6875	99.582	80.5385
96	0.225	11.875	100.1406	80.535

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
97	0.2109	10.7812	99.1758	80.4945
98	0.2016	11.0938	99.582	80.5209
99	0.2063	10.7812	99.4805	80.5174
100	0.1734	10.7812	98.668	80.5068
101	0.1781	8.9062	99.6328	80.6334
102	0.1688	11.25	99.4297	80.6141
103	0.1406	11.7188	99.5313	80.6615
104	0.1078	9.375	99.7344	80.5736
105	0.1406	11.875	98.7695	80.6527
106	0.1219	10.9375	98.668	80.5701
107	0.1266	9.0625	99.5313	80.6211
108	0.1313	10.7812	99.8867	80.6545
109	0.0984	10.7812	99.0742	80.6967
110	0.1266	10.1562	99.1758	80.6457
111	0.1172	11.5625	99.1758	80.6404
112	0.0891	11.7188	98.5664	80.6879
113	0.1078	10	99.2774	80.6896
114	0.1078	12.9688	98.8711	80.6387
115	0.0938	10.3125	99.1758	80.6914
116	0.0703	9.8438	99.4805	80.6861
117	0.0844	11.0938	98.5156	80.7055
118	0.0656	10.625	98.3125	80.7705
119	0.0797	10.9375	99.125	80.8092
120	0.0703	12.1875	99.4297	80.8162
121	0.0656	12.1875	98.2109	80.8127
122	0.0656	9.8438	98.6172	80.8021
123	0.0703	11.7188	98.5664	80.8496
124	0.0469	9.6875	98.7695	80.9129
125	0.0656	9.6875	98.4649	80.9568
126	0.0516	11.4062	98.4141	80.9059
127	0.0328	10.7812	98.4649	80.985
128	0.0234	10.7812	98.8711	80.8971
129	0.0281	10.4688	99.1758	80.9955
130	0.0328	10.3125	98.5156	80.9129
131	0.0188	10.9375	98.8203	81.0184
132	0.0094	9.0625	98.1601	80.9129
133	0.0188	9.8438	99.0234	80.9885
134	0.0094	9.5312	98.5156	81.0693
135	-0.0047	10.625	98.9726	81.0061
136	-0.0094	10.3125	98.2617	81.1115
137	-0.0047	10.3125	98.7695	80.9973
138	-0.0234	11.0938	98.6172	81.0395
139	-0.0234	10.4688	98.8203	81.0816
140	-0.0281	10	98.0586	81.0412
141	-0.0281	12.5	97.6016	81.1572
142	-0.0094	10.7812	98.0078	81.1484
143	0.0609	10.7812	98.668	81.1941
144	0.0516	11.875	98.7695	81.1959

Table A-7. Defuel Drum—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
145	0.0563	10.4688	98.0078	81.2328
146	0.0469	11.0938	97.8555	81.2117
147	0.0516	10.9375	98.0586	81.3C56
148	0.0516	10.9375	98.1601	81.3172
149	0.0469	10.1562	98.1601	81.2768
150	0.0422	10.4688	97.6524	81.2662
151	0.0609	9.5312	98.1601	81.2732
152	0.0422	12.3438	97.8047	81.3313
153	0.0797	9.5312	98.4141	81.333
154	0.0469	9.8438	98.0586	81.3594
155	0.0328	10.9375	97.7539	81.377
156	0.0469	10.9375	97.2969	81.3875
157	0.0281	10.625	97.5	81.449
158	0.0375	10.3125	97.957	81.4771
159	0.0469	10.3125	98.2617	81.5053
160	0.0281	12.1875	97.7031	81.5158
161	0.0141	11.25	98.0078	81.6318
162	0.0469	11.5625	97.957	81.5598
163	0.0422	9.6875	98.4649	81.5545
164	0.0141	10.1562	97.3984	81.6863
165	0.0141	11.4062	97.6016	81.5949
166	0.0188	9.8438	98.4141	81.5896
167	0.0094	10	97.7031	81.6301
168	0.0094	10.9375	97.1953	81.565
169	0.0094	11.7188	97.5	81.6055
170	-0.0047	10.625	97.5508	81.6494
171	0.0141	9.2188	97.5508	81.6652
172	0.0141	10.1562	98.0078	81.5457
173	0.0141	11.25	96.9922	81.667
174	0.0188	10.1562	96.8906	81.6406
175	-0.0188	12.0312	97.3984	81.6898
176	0	10.4688	97.043	81.5896
177	0.0094	10.7812	97.5	81.7004
178	-0.0047	10.7812	97.7539	81.6547
179	0	9.8438	96.8399	81.7092
180	-0.0047	11.4062	97.8047	81.7039
181	-0.0141	10.4688	97.5	81.6934
182	0	10.625	96.9414	81.6793
183	-0.0094	9.2188	97.3984	81.7215
184	-0.0094	10.9375	96.8906	81.7285
185	-0.0281	10.1562	97.7031	81.6811
186	-0.0891	10.4688	96.7383	81.7092
187	-0.2063	8.9062	96.7383	81.667
188	-0.3422	11.4062	96.332	81.7004
189	-0.4031	10.7812	97.6524	81.7672
190	-0.3938	10.9375	97.043	81.6863
191	-0.225	11.4062	96.7891	81.718
192	-0.1406	9.0625	97.2969	81.7197

Table A-7. Defuel Drum—Carter Refuel/Defuel Valve (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	Amb Temp Deg F
193	-0.1453	9.5312	96.7383	81.7918
194	-0.1172	11.0938	95.9766	81.7461
195	-0.1406	7.8125	94.5039	81.7215
196	-0.1453	11.25	93.3867	81.7689
197	-0.1641	3.9062	88.918	81.7795
198	-0.1313	4.0625	59.5664	81.7707
199	-0.15	-0.1562	37.4766	81.7602
200	-0.15	3.75	18.8906	81.7408
201	-0.15	0.9375	30.6211	81.8393
202	-0.1406	-1.0937	9.5977	81.7742
203	-0.1406	-0.1562	2.1328	81.8305
204	-0.1406	-0.9375	5.2813	81.8252
205	-0.1266	-0.3125	1.7773	81.8586

Table A-8. Empty Drum—3-Inch Kamvalok

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	AMB TEMP Deg F
1	4.2281	3.2812	13.9141	72.8727
2	4.1203	2.5	11.9336	72.848
3	4.0828	3.75	12.1875	72.8586
4	4.05	4.2188	10.7656	72.8691
5	4.0125	4.375	13.5586	72.9166
6	3.9563	4.5312	15.793	72.9447
7	3.9047	5	16.6562	72.8973
8	3.8484	5.3125	20.8203	72.8586
9	3.7078	12.5	30.875	72.9201
10	3.3797	24.375	117.6602	72.9359
11	3.0516	17.5	139.2929	72.899
12	2.7141	22.0312	120.25	72.9799
13	2.4094	23.75	141.8828	72.957
14	2.1234	24.5312	141.7812	72.9307
15	1.9125	22.5	147.1133	72.9359
16	1.6828	23.9062	144.8281	72.9641
17	1.5047	20	140.664	72.8533
18	1.3359	20	134.3164	72.8586
19	1.2234	26.25	129.6953	72.8709
20	1.0547	21.4062	136.4492	72.8059
21	0.9844	22.1875	137.7696	72.8234
22	0.8859	25.3125	138.3789	72.79
23	0.8156	22.1875	136.6015	72.8357
24	0.7828	22.5	140.1054	72.8234
25	0.7219	25.9375	141.6289	72.8023
26	0.6984	23.125	146.8086	72.7619
27	0.6656	25.625	155.7461	72.7883
28	0.5672	29.5312	159.5547	72.8533
29	0.5063	30.625	159.6563	72.7883
30	0.4266	31.875	162.8554	72.7514
31	0.3844	36.0938	169.3554	72.7373
32	0.3188	35.9375	178.5976	72.7936
33	0.3141	35.625	182.0508	72.6898
34	0.2906	35.9375	180.0703	72.7637
35	0.2906	34.5312	179.7149	72.8287
36	0.2438	32.6562	174.4843	72.7373
37	0.2438	32.8125	170.9804	72.7654
38	0.2203	31.5625	169.5586	72.7338
39	0.2016	31.4062	164.836	72.7602
40	0.2813	32.6562	163.8711	72.7496
41	0.225	32.3438	160.6211	72.7918
42	0.2156	29.2188	159.6054	72.8094
43	0.2156	29.8438	165.6485	72.7988
44	0.1453	27.8125	162.1953	72.7619
45	0.15	23.75	159.0976	72.8199
46	0.1266	28.4375	162.8554	72.8199
47	0.0891	24.8438	161.2812	72.79
48	0.1172	23.9062	157.5742	72.8463

Table A-8. Empty Drum—3-Inch Kamvalok (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	AMB TEMP Deg F
49	0.0516	24.2188	161.5351	72.8516
50	0.0516	25	157.9804	72.9131
51	0.0516	28.4375	157.1172	72.8938
52	0.0516	39.2188	171.9961	72.9219
53	0.0234	34.6875	183.0156	72.7777
54	0	36.875	189.414	72.8305
55	0.0094	38.125	158.6407	72.8428
56	-0.0188	37.3438	133.3515	72.9131
57	-0.0188	39.6875	160.5703	72.8498
58	-0.0328	38.4375	122.586	72.9096
59	-0.0422	39.5312	167.1211	72.8779
60	-0.0422	38.125	149.9062	72.8938
61	-0.0563	38.2812	131.7265	72.8955
62	-0.0938	36.5625	154.3242	72.9008
63	-0.0844	36.4062	135.8907	72.9025
64	-0.1078	34.2188	168.8476	72.8902
65	-0.0563	35.625	186.4688	72.95
66	-0.0938	34.5312	188.1446	72.9289
67	-0.1031	39.8438	183.1172	72.8727
68	-0.1172	31.875	181.1367	72.9307
69	-0.1313	30.3125	176.5664	72.9096
70	-0.1125	32.0312	175.7539	72.899
71	-0.1219	28.75	172.9101	72.8744
72	-0.1453	27.3438	172.6054	72.8797
73	-0.1453	29.6875	165.4961	72.885
74	-0.1641	34.5312	180.8828	72.8639
75	-0.15	36.5625	165.6485	72.8533
76	-0.1547	36.5625	149.3476	72.8428
77	-0.1359	41.4062	135.8907	72.8691
78	-0.1453	36.7188	148.2813	72.885
79	-0.1406	38.4375	151.2774	72.8604
80	-0.1453	39.0625	159.0469	72.9131
81	-0.15	38.5938	186.875	72.9447
82	-0.1734	36.875	190.6836	72.9254
83	-0.1875	39.375	190.8867	72.9043
84	-0.1641	38.125	190.2774	72.8674
85	-0.1734	36.25	189.7188	72.9166
86	-0.1734	38.4375	190.9375	72.827
87	-0.1922	39.2188	191.2422	72.9025
88	-0.1969	40.7812	190.0235	72.8814
89	-0.2016	38.4375	191.2422	72.8814
90	-0.1875	40.7812	190.2774	72.8357
91	-0.2156	38.9062	189.7696	72.8832
92	-0.2016	39.6875	189.9726	72.8305
93	-0.1969	39.2188	190.6836	72.8146
94	-0.2016	39.8438	191.2929	72.8604
95	-0.2109	36.4062	189.5664	72.8375
96	-0.2156	38.9062	190.7851	72.8129

Table A-8. Empty Drum—3-Inch Kamvalok (continued)

TIME SECONDS	TANK PRE PSIG	LINE PRE PSIG	FLOW GPM	AMB TEMP Deg F
97	-0.1922	39.8438	191.4453	72.8938
98	-0.2203	37.5	191.4453	72.7461
99	-0.225	39.8438	191.039	72.8305
100	-0.2156	40.3125	189.9218	72.7408
101	-0.2297	38.2812	191.0899	72.7742
102	-0.2063	37.3438	191.3437	72.732
103	-0.225	37.3438	191.5976	72.7426
104	-0.2297	38.2812	190.4804	72.7795
105	-0.2203	38.75	191.3437	72.8076
106	-0.2297	38.4375	190.9375	72.7443
107	-0.2344	37.6562	191.3437	72.8041
108	-0.2203	39.375	191.0899	72.8305
109	-0.225	38.2812	190.9883	72.8586
110	-0.2391	39.0625	191.1914	72.7953
111	-0.2203	38.4375	191.4961	72.8111
112	-0.2297	38.75	191.1407	72.8814
113	-0.2391	38.4375	191.8008	72.8428
114	-0.2297	23.125	187.2812	72.8006
115	-0.2672	1.25	95.5195	72.7813
116	-0.2531	1.4062	38.543	72.7953
117	-0.2672	0.9375	30.3164	72.7813
118	-0.2531	0.7812	20.7695	72.7654
119	-0.2578	0.4688	13.1016	72.8182
120	-0.2672	-0.1562	8.125	72.7813
121	-0.2578	0.625	3.7578	72.8252
122	-0.2484	-0.625	1.8789	72.8639
123	-0.2531	-0.3125	1.625	72.885
124	-0.2484	-0.1562	1.0156	72.8955
125	-0.2672	-0.7812	0.5078	72.8762

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